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Hospitalizations for Assault-related Injuries, Active Component, U.S. Armed Forces, January 1998-June 2007

Assault injuries are those intentionally inflicted by another person, excluding combat or terrorist attacks. Injuries that occur during fights or brawls cause significant morbidity, mortality, and operational ineffectiveness among military members. In previous studies of U.S. Army soldiers, risk factors for being injured during assaults/physical fighting included being male, younger aged, black race, unmarried, lower rank, and having an alcohol comorbidity.[1,2]

This report describes the natures and frequencies of assault-related hospitalizations among members of active components of the U.S. Armed Forces since January 1998. In addition, it documents concurrent and preceding mental disorder diagnoses and prior deployment in support of Operation Enduring Freedom (OEF) and/or Operation Iraqi Freedom (OIF) among those hospitalized with assault-related injuries.

Methods:

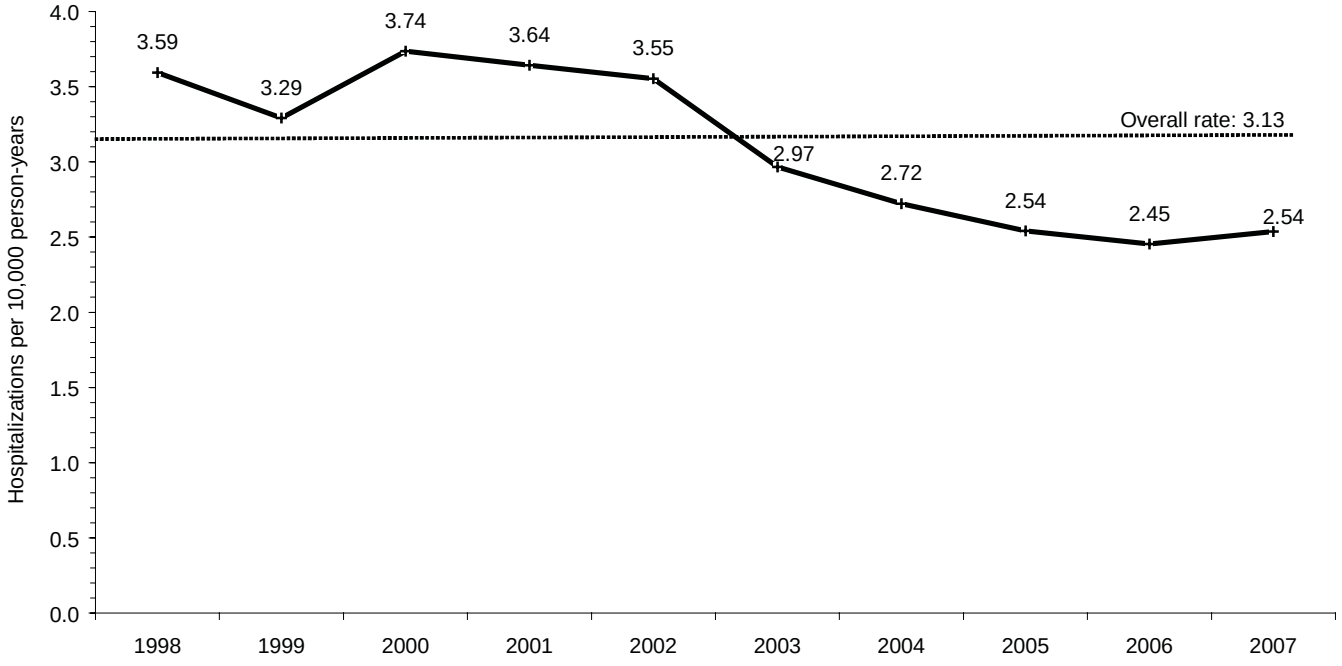
The surveillance period was 1 January 1998 to 30 June 2007. The surveillance population included all individuals who served in an active component of the U.S. Armed Forces any time during the surveillance period. Cases were ascertained from hospitalization records that are routinely maintained in the Defense Medical Surveillance System (DMSS).

For surveillance purposes, an "assault-related injury" was defined as a hospitalization with at least one of the following: (a) Standard NATO Agreement (STANAG) trauma code = 3 ("assault, or intentionally inflicted by another person"); (b) STANAG injury code = 970-979 ("fighting") plus STANAG trauma code = 5-9 (to exclude combat-related and self-inflicted injuries); and/or (c) ICD-9-CM external cause of injury code = E960.0 ("unarmed fight or brawl").

Assault-related hospitalizations that likely occurred during OEF/OIF deployment (defined as hospitalizations at Landstuhl Regional Medical Center, Germany, with admission dates between reported start and end dates of OEF/OIF deployment) were excluded (n=272). Other hospitalizations were excluded if subject injuries were reported as "combat-related" or "self-inflicted" (STANAG trauma codes = 0, 1, 2, or 4; and/or ICD-9-CM external cause of injury codes = E950-959 and/or E990-999) (n=64). Finally, 49 hospitalizations for injuries that were considered related to the terrorist bombing of the *USS Cole* in October 2000 were excluded.

Hospitalizations were sorted by types of injuries based on primary (first-listed) diagnoses. Secondary diagnoses were then searched to determine if there were concurrent diagnoses of metacarpal fracture (suggestive of aggression/active defense during an assault) and/or mental disorder (including alcohol, adjustment/PTSD, and/or affective disorder). In addition, ambulatory visit records were searched to determine

Figure 1. Annual rate of hospitalization for assault-related injuries, active component, U.S. Armed Forces, January 1998-June 2007



if individuals who were hospitalized with assault-related injuries were treated for metacarpal fractures and/or mental disorders within the year preceding the hospitalization.

Fatalities from assault-related injuries were estimated from assault-related hospitalization records that reported "deaths" in the emergency room, on arrival at the hospital or during an inpatient stay. Finally, for this analysis, service members were considered "separated from military service" if they were not included on a roster of all active U.S. military members for six consecutive months after an assault-related hospitalization.

Results:

From January 1998 to June 2007, there were 4,213 hospitalizations of 4,105 service members for injuries related to non-combat assaults and fighting. During the period, 104 service members (2.5%) were hospitalized twice and two were hospitalized three times for assault-related injuries. Approximately one of 16 (6.3%) of all injuries that resulted in hospitalizations were sustained during assaults.

The overall rate of assault-related hospitalizations was 3.13 per 10,000 person-years (p-yrs) (range, per year: 2.45 per 10,000 p-yrs [in 2006] – 3.74 per 10,000 p-yrs [in 2000]) **(Figure 1).** Rates were generally lower during the last compared to the first 5 years of the period: annual rates from 2003 to 2007 were consistently lower than 3.0 per 10,000 p-yrs **(Figure 1).**

During the period, the mean number of assault-related hospitalizations per month was 37 (range: 18-56). On average, the most assault-related hospitalizations occurred during the months of July (mean: 41.6) and September (mean: 39.8) and the least during December (mean: 29.3) and February (mean: 32.8). Of note, of the 20 days during the surveillance period when the most assault-related hospitalizations occurred, four were New Year's days (1 January) of 1998, 1999, 2000, 2001

Table 1. Numbers and rates* of hospitalizations for assault-related injuries, by demographic and military characteristics, active components, U.S. Armed Forces, January 1998 - June 2007

	Army		Navy		Air Force		Marine Corps		All services		
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	Rate ratio
Total	2,219	4.84	838	2.41	383	1.13	773	4.67	4,213	3.25	via
Sex											
Male	2,025	5.19	800	2.68	348	1.27	762	4.89	3,979	3.56	2.40
Female	194	2.86	38	0.78	35	0.54	11	1.11	283	1.48	ref
Age group (years)											
<19	79	6.54	16	1.90	12	2.08	36	4.54	143	4.18	5.10
19-20	551	9.98	190	4.66	77	2.46	245	6.82	1,078	6.61	8.06
21-22	585	9.29	256	5.40	100	2.53	281	7.57	1,228	6.57	8.01
23-24	377	6.93	153	3.84	64	1.72	101	4.81	699	4.58	5.59
25-29	394	3.94	133	1.86	83	1.19	86	3.07	701	2.60	3.18
30+	233	1.34	90	0.65	47	0.30	24	0.67	413	0.82	ref
Race/ethnicity											
Black non-Hispanic	510	4.56	196	3.07	79	1.53	111	4.98	914	3.66	1.15
White non-Hispanic	1,345	4.98	459	2.22	231	0.97	510	4.77	2,572	3.13	0.98
Hispanic	232	5.21	116	2.94	43	1.70	88	3.78	483	3.64	1.15
Asian/Pacific Island	59	3.65	29	1.27	13	1.08	12	2.49	113	2.02	0.64
Native Alaskan/American	23	5.58	26	3.06	5	1.85	25	7.17	79	4.20	1.32
Others	50	4.30	12	2.12	12	1.27	27	5.37	101	3.18	ref
Grade											
Enlisted	2,165	5.65	1,640	5.54	367	1.35	769	5.19	4,168	3.79	8.51
Jr enlisted (E1-E4)	1,786	8.51	655	4.52	285	2.27	690	6.96	3,441	5.94	13.33
Sr enlisted (E5-E9)	379	2.18	165	1.09	82	0.56	79	1.61	727	1.40	3.14
Officer (+warrant)	54	0.72	18	0.35	16	0.24	4	0.23	94	0.45	ref
Marital status											
Never married	1,536	8.07	634	3.80	239	2.20	600	6.94	3,031	5.49	2.46
Married	614	2.49	204	1.13	116	0.56	160	2.17	1,121	1.58	0.71
Divorced/sep/widow	69	3.29	0	0.00	28	1.22	13	2.40	110	2.23	ref
Military occupation											
Combat	857	6.81	100	2.06	37	0.76	264	5.96	1,264	4.73	1.59
Medical	145	3.34	61	1.78	14	0.43	0	0.00	220	2.00	0.67
Other	1,217	4.21	677	2.56	332	1.29	509	4.19	2,778	2.98	ref

*Hospitalizations per 10,000 person-years

and one was the day after New Year's (2 January) of 2002.

Rates were more than twice as high among males than females and were higher among 19-22 year olds, junior enlisted (E1-E4), never married, those in combat occupations, and members of the Army and Marine Corps compared to their respective counterparts **(Table 1)**. In regard to self-described race/ethnicities, crude rates of assault-related hospitalizations were highest among Alaska Natives/American Indians (4.20 per 10,000 p-yrs), lowest among Asians/Pacific Islanders (2.02 per 10,000 p-yrs), and intermediate among white non-Hispanics (3.13 per 10,000 p-yrs), black non-Hispanics (3.66 per 10,000 p-yrs), and Hispanics (3.64 per 10,000 p-yrs) **(Table 1)**.

From January 2002 through June 2007, 42.5% of all assault-related hospitalizations affected service members who had served in Afghanistan and/or Iraq (range, by year: 31.0% [in 2002] – 50.3% [in 2005, 2006]). Among assault-related hospitalizations of OEF/OIF deployers, fewer than 1 of 25 (3.8%) occurred within 30 days – and fewer than 1 of 8 (11.6%) within 120 days – of returning from deployment **(Figure 2)**.

During the surveillance period, the largest numbers of hospitalizations for assault-related injuries were at Navy hospitals in San Diego, CA (n=353), Portsmouth, VA (n=246), and Camp Lejeune, NC (n=209) and at Army hospitals in Honolulu, Hawaii (n=285), and Seoul, Korea (n=220).

More than half of all assault-related hospitalizations had a primary diagnosis of a head/traumatic brain injury (skull fracture: 41.9%; concussion or other head injury: 9.9%) **(Table 2)**. Wounds (14.3%), non-skull fractures (8.3%), mental disorders (5.9%), internal injuries (3.2%), and contusions (2.7%) also accounted for relatively large numbers of assault-related hospitalizations **(Table 2)**.

Metacarpal fractures (suggestive of aggression/active defense during a fight) were among the reported injuries of relatively few (n=101; 2.4%) hospitalized for assault **(Figure 3)**. Slightly more (overall: 5.7%; range: 2.4% [1998] – 9.4% [2004]) assault-injured service members had metacarpal fractures (possibly related to fighting) within the year prior to their assault-related hospitalizations **(Figure 3)**. Both concurrent and recent metacarpal fractures were relatively more frequent after than before 2002 **(Figure 3)**.

Approximately one-fifth (20.8%) of all service members hospitalized with assault-related injuries received mental disorder diagnoses during the same hospitalization **(Figure 4)**. The proportions of assault-related hospitalizations with concurrent mental disorder diagnoses increased from 1999 through 2001 (25.2%), sharply declined through 2003 (11.9%), and then increased in 2007 (31.3%). Of all service members hospitalized with assault-related injuries during the period, one of 9 (11.2%), one of 25 (3.9%), and one of 48 (2.1%) received concurrent alcohol-related, adjustment disorder, and affective disorder diagnoses, respectively **(Figure 4)**.

Approximately one-third (33.4%) of all service members hospitalized with assault-related injuries received mental disorder diagnoses during outpatient visits within one year prior to their hospitalizations. The percentages of assault-injured service members with prior mental disorder diagnoses steadily increased from 1998 (18%) to 2004 (47.5%) and

Figure 2. Distribution of hospitalizations for assault-related injuries among deployers to OEF/OIF, by days since return from deployment, by calendar year, active component, U.S. Armed Forces, January 2002-June 2007

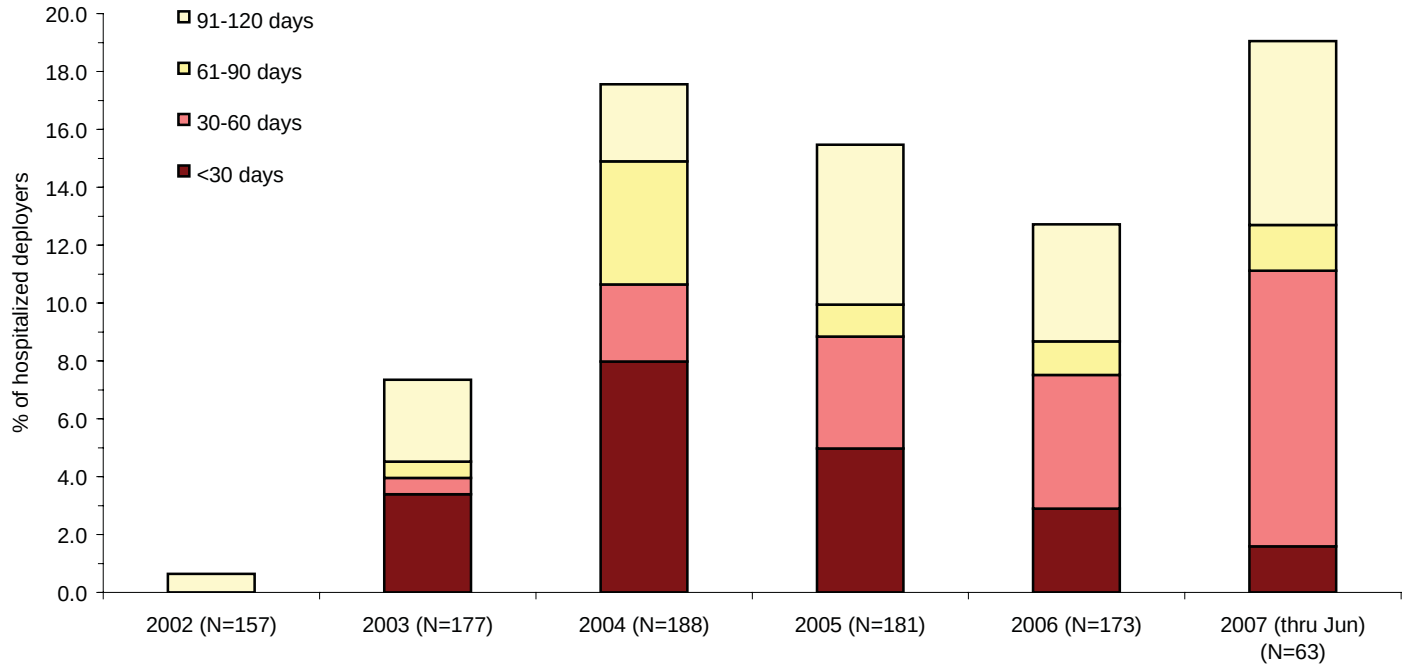


Table 2. Hospitalizations for assault-related injuries, by primary (first-listed) diagnosis, active component, U.S. Armed Forces, January 1998-June 2007

Primary diagnosis	ICD-9-CM code(s)	No.	Rate*	% of total
Head/traumatic brain injury (TBI)	800-804,850-854,959.01	2,205	1.64	51.7
Skull fractures	800-804	1,784	1.33	41.9
Concussions and other head injuries	850-854, 959.01	421	0.31	9.9
Wounds	870-897	608	0.45	14.3
Other Fractures	805-829	353	0.26	8.3
Non-skull fractures, metacarpal	815, 817	76	0.06	1.8
Non-skull fractures, all others	805-814, 816, 818-829	277	0.21	6.5
Mental disorders	290-319	252	0.19	5.9
Internal injuries	860-869	136	0.10	3.2
Other, not elsewhere classified (NEC)	NEC	139	0.10	3.3
Contusions	920-924	112	0.08	2.6
Other injury	800-959 NEC	93	0.07	2.2
Adult maltreatment/sexual abuse	995.80,.81,.83	79	0.06	1.9
Poisoning/toxic effects	960-989	68	0.05	1.6
Observation	v71	49	0.04	1.1
Sprains/strains	840-848	40	0.03	0.9
Dislocations	830-839	25	0.02	0.6
Superficial injuries	910-919	19	0.01	0.4
External causes/complications of care	990-999 NEC	18	0.01	0.4
Nerve/spinal cord	950-957	17	0.01	0.4
Total		**4,213**	**3.13**	**100.0**

* Hospitallizations per 10,000 person-years

Figure 3. Percentage of service members hospitalized for assault-related injuries who had concurrent and/or preceding diagnosis of metacarpal fracture (suggestive of aggression/active defense during assault), by calendar year, active component, U.S. Armed Forces, January 1998 - June 2007

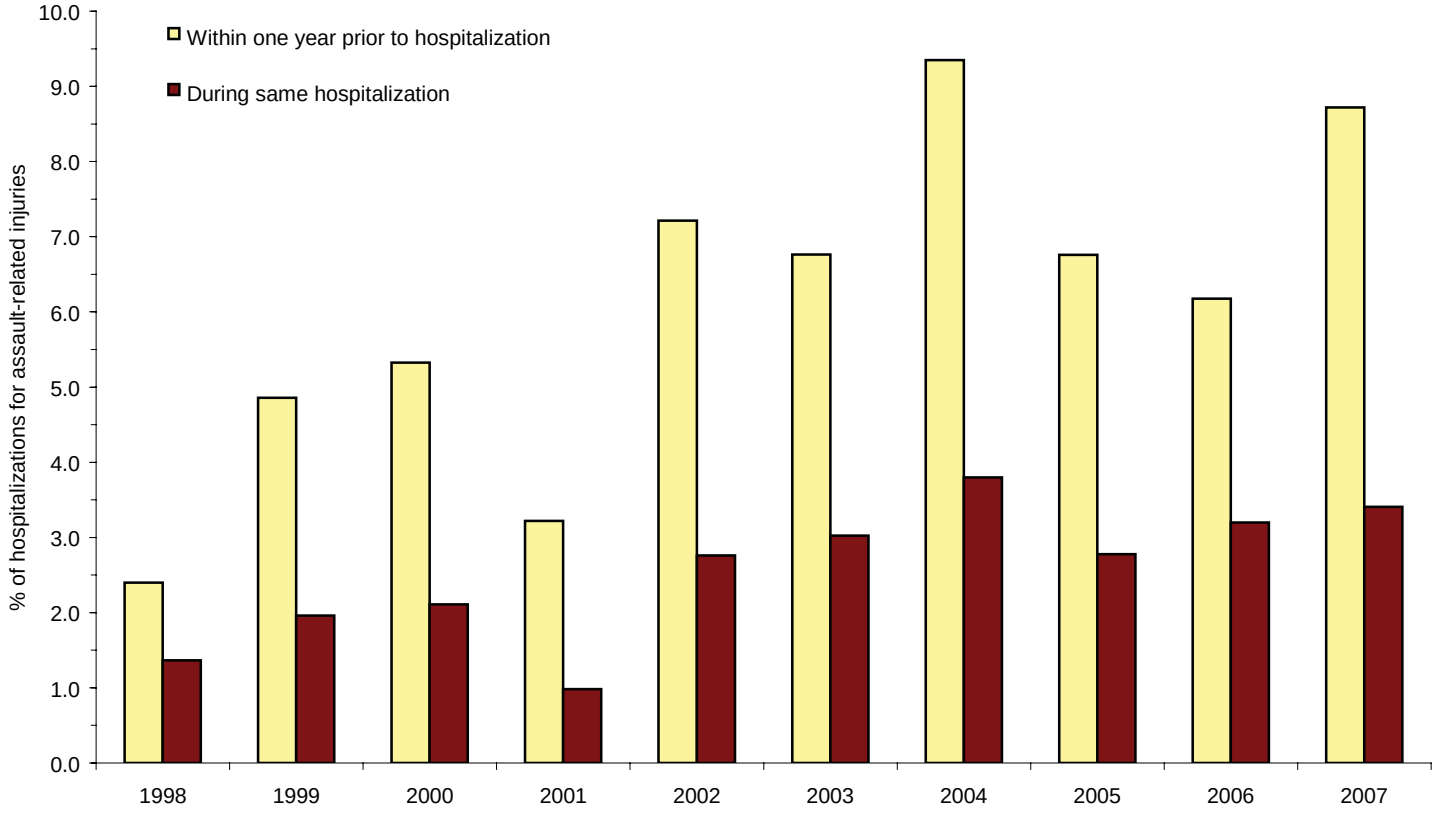


Figure 4. Percentage of service members hospitalized for assault-related injuries who received mental disorder diagnoses during the same hospitalization, by category of mental disorder, by year, active components, U.S. Armed Forces, January 1998 - June 2007

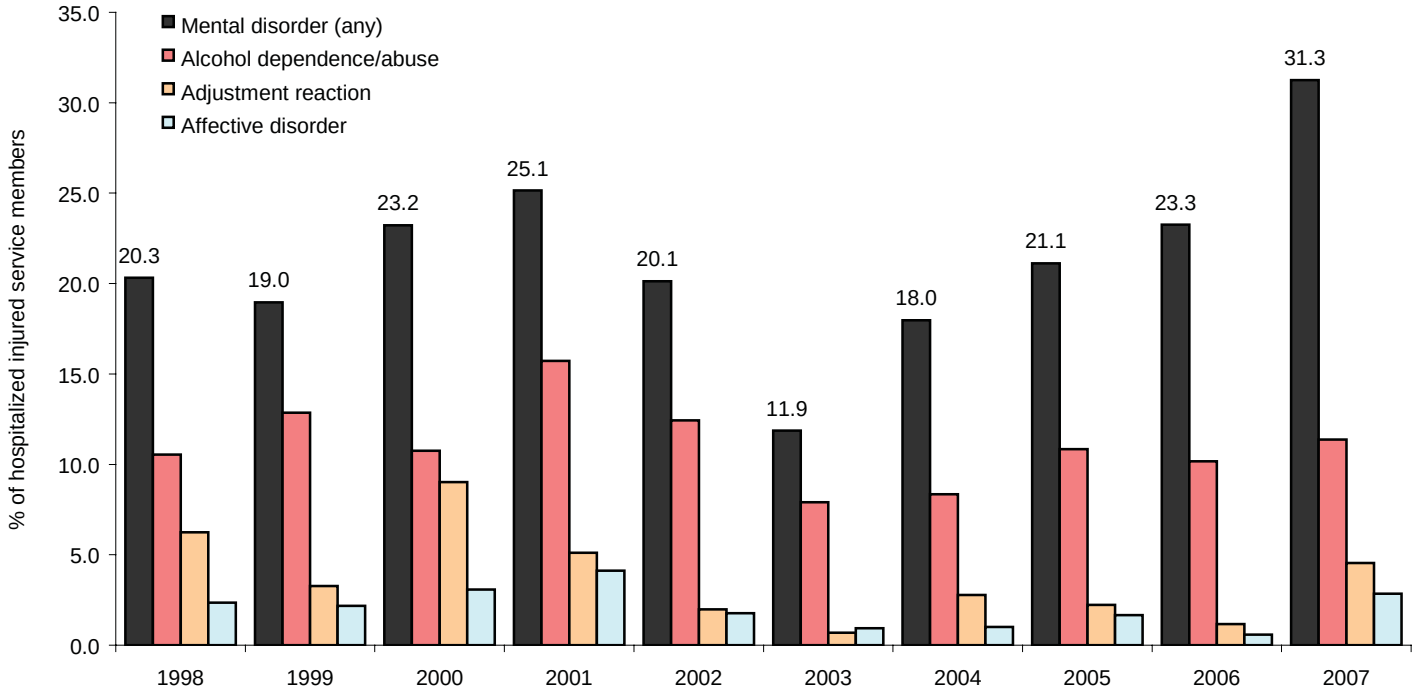
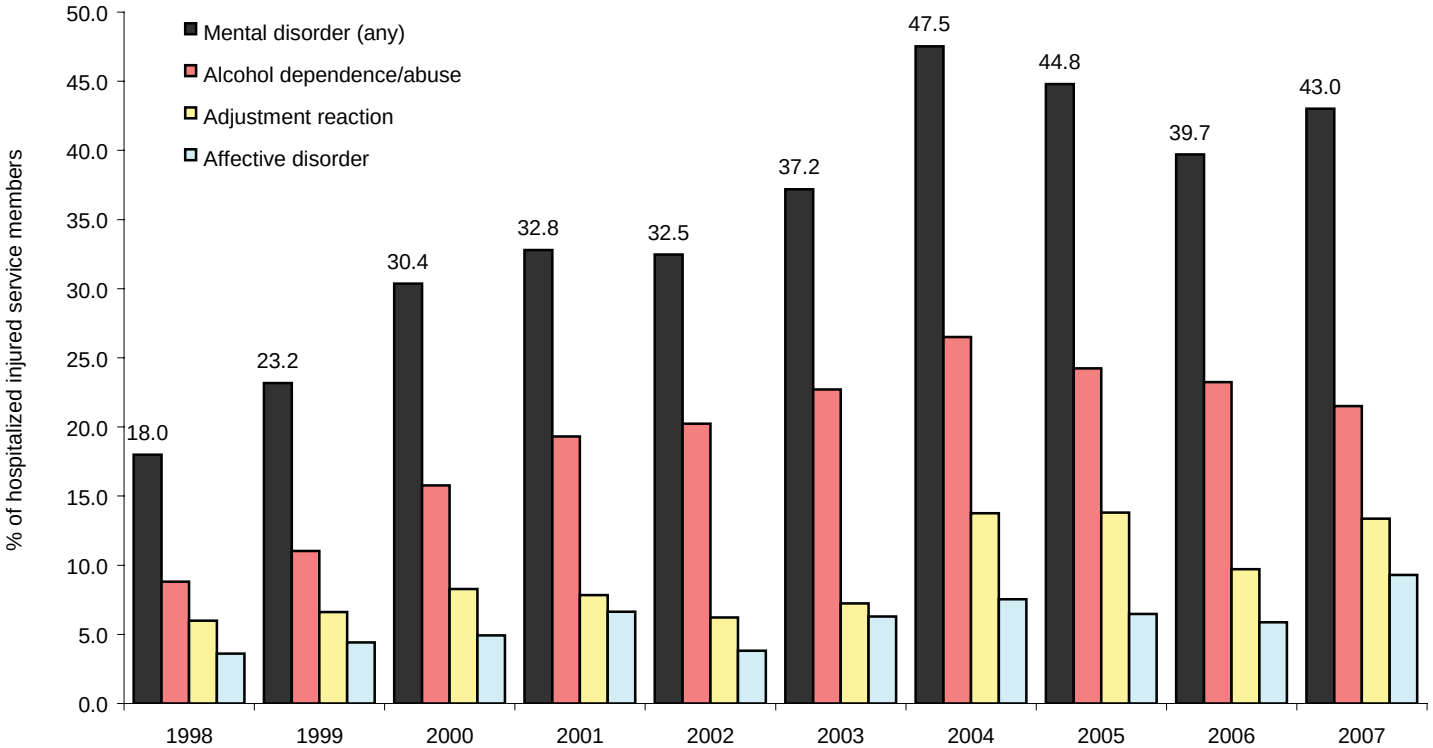


Figure 5. Percentage of service members hospitalized for assault-related injuries who received an outpatient mental disorder diagnosis within one year prior to hospitalization, by category of mental disorder, by year, active components, U.S. Armed Forces, January 1998 - June 2007



then slightly declined **(Figure 5)**.

Most mental disorder diagnoses received prior to an assault hospitalization were alcohol-related **(Figure 5)**. Overall, nearly one-fifth (18.6%) of all hospitalizations for assault-related injuries affected service members who had received outpatient diagnoses of alcohol dependence/abuse within the prior year. Not surprisingly, the trend of percentages of assault-injured service members with prior mental health diagnoses overall closely reflects the trend of percentages with prior alcohol-related diagnoses **(Figure 5)**.

For the entire period, the mean length of hospitalization for assault was 4.1 days. Approximately one of 9 (11.5%) of the hospitalizations was 7 days or longer; and slightly fewer (10.8%) were one day or less. Approximately one of 11 (9.2%) of all assault-related hospitalizations included medical/surgical intensive care.

Overall, approximately one of 30 (3.3%) service members hospitalized for assault-related injuries did not survive the acute injury/initial medical encounter. In comparison, during the same period, 1.6% and 0.4% of service members hospitalized for "any injury" and for "any cause" reportedly died during the hospitalization. The case fatality proportion peaked at 6.8% in 1999 but was less than 1.5% each year from 2004 through 2007 (data not shown).

Finally, from 1998 through 2005, nearly one-third (29.7%) of assault-injured service members separated from military service within 12 months of hospitalization (range, per year: 25.9% [2002] – 32.8% [1998]). The proportion of hospitalized service members who separated from service within one year was slightly higher among those injured during assaults than with injuries in general (24.5%) but lower than among those hospitalized for any cause (36.8%) (data not shown).

Editorial comment:

This report reiterates and expands the findings of previous reports regarding the nature and magnitude of the threat of assault-related injuries to U.S. military members. The findings are interesting, informative, and potentially useful for designing and conducting prevention programs; however, they should be interpreted cautiously in light of inherent limitations.

The analysis was based on standardized hospitalization records that indicated that primary (first-listed) diagnoses were "injuries" and their causes were "assaults" or "fighting" unrelated to combat. In turn, the completeness and accuracy of case ascertainment depended on the completeness and accuracy of documenting, coding, and entering relevant data – which likely varied across hospitals (e.g., military versus civilian [reimbursed]).

Also, for every assault-related injury that resulted in a hospitalization, there were undoubtedly many more that were treated at emergency and other ambulatory clinics, by medical personnel assigned to military units, and by affected individuals themselves. Recent studies in non-military populations revealed that only 14% of adults and 4% of adolescent males sought medical treatment for injuries sustained during assaults.[3,4] Such findings may not be particularly applicable to U.S. military assault victims, however. For example, U.S. service members have "free and ready" access to medical care, they require medical evaluations to be excused from or limited in their occupational duties, their supervisors are responsible and actively concerned for their health and well being, and so on – all may increase the likelihood of injured service members seeking medical treatment. On the other hand, injured service members may deny that their injuries were incurred during fighting or require medical treatment, may fear that treatment in a medical facility could lead to disciplinary action, and so on. In summary, the findings of this analysis undoubtedly reflect the "tip of the iceberg" of the morbidity, mortality, and military operational decrement caused by injuries intentionally inflicted by others.

Of interest, hospitalization rates for assault-related injuries were lower during the 5 years after compared to before 2003. In U.S. as in other military populations, unmarried, younger aged, junior enlisted males in combat occupations are generally at highest risk of injury from assault.[1,2] Also, in this analysis, assault-related hospitalizations occurred at higher rates among members of the Army and Marine Corps than the other Services. Thus, lower rates of assault-related hospitalizations after compared to before 2003 reflect, at least in part, the effect of deployment to OEF/OIF of large numbers of the service members at highest risk of assault-related injury when not deployed.

This analysis was not designed to assess the effects (if any) of deployment on assault-related hospitalization risk; hence, the results are not directly informative regarding this question. For example, relatively large numbers of deployers to OEF/OIF are young male soldiers and Marines in combat occupations, i.e., the service members at highest risk of assault-related injuries in general. In turn, relatively high rates of assault-related injuries would be expected among recently returned deployers regardless of the effects of deployment on subsequent risk of assault. Among previous deployers in general, the percentages of assault-related hospitalizations that occurred within 30 days after returning from OEF/OIF were relatively low and steadily decreased from 2004 through the first half of 2007. Also, the percentages of assault-related hospitalizations that occurred within 60, 90, and 120 days after returning from deployment were relatively low and generally declined from 2004 to early 2007. While such findings are interesting, they are not directly informative regarding the relationship between deployment and subsequent assault-related injury risk.

Among U.S. service members, "traumatic brain injuries" (i.e., skull fractures, concussions, and other head injuries) were the primary reason for approximately half (51.7%)

of all assault-related hospitalizations. In general, injuries to the head and face are the most common serious injuries (e.g., requiring hospital care) from assaults. For example, a recent hospital-based study in the United Kingdom revealed that more than two-thirds (69.2%) of male and three-fifths (59.0%) of female assault victims sustained injuries to the head, face, and/or neck.[3] Because popular media (e.g., television, motion pictures, video games) often portray violent acts but rarely their realistic consequences, many adolescents and young adults – including those in military service – may not realize the serious and sometimes lethal effects of trauma to the head that can be inflicted during assaults, brawls, and physical fighting. Perhaps, accurate knowledge of such consequences would alter attitudes and change behaviors regarding brawling and other fighting.

In this analysis, the settings (e.g., on or off a military installation; in barracks, private residence, club, bar; on duty, in transit, on leave) and contexts (e.g., alone, with others; family disturbance, personal disagreement, brawl, mugging, robbery) of assault-related injuries could not be discerned from available records. An unknown proportion of the injury hospitalizations caused by fighting resulted from hand-to-hand combat training (combatives). Such hospitalizations, in this analysis, were indistinguishable from those caused by off-duty fighting or barrack brawls.

Also, from records available for this analysis, it could not be determined if hospitalized service members were perpetrators or victims during assaults. Of note, more than 100 (2.4%) service members hospitalized with assault-related injuries had concurrent diagnoses of metacarpal fractures suggesting that the injuries may have occurred while fist fighting. Other findings also suggest that many assaulted service members were not passive victims. For example, mental disorder diagnoses (particularly related to alcohol abuse) were relatively common among those hospitalized with assault-related injuries – approximately one of 5 (20.8%) and one of 3 (33.4%) had mental disorders diagnosed while they were hospitalized and/or during outpatient visits, respectively, within the prior year.

The relationship between mental disorders (particularly alcohol abuse) and risk of injury (particularly assault-related) has been extensively documented in military and other settings. For example, in 2006, Cameron and colleagues reported that adults hospitalized with injuries (intentional and unintentional) compared to randomly selected others in Manitoba, Canada, were 9.3 times more likely to have been hospitalized for a mental disorder in the preceding year.[5] In 1999, Wardle reviewed records of adult trauma victims in the United Kingdom and estimated that approximately one-third (30%) had prior mental disorder diagnoses; and of those who were intoxicated at the time of their trauma, three-fourths (75%) had prior psychopathologic diagnoses.[6] In 1997, Poole and colleagues found that approximately two-thirds (63%) of adults with intentional (not self-inflicted) traumatic injuries who were hospitalized at the University of Mississippi Medical Center had psychopathology (based on structured interviews).[7] Compared to accidentally injured and elective surgery patients at the same hospital, intentional trauma victims were more likely to use alcohol and to have antisocial personalities (28%) – and in general, they had more severe psychopathology.[7]

In summary, this report and many others document that young adults with mental disorders (particularly related to alcohol abuse) are at relatively high risk of serious injury, including from assaults.[8,9] Yet, during the past 25 years among U.S. service members, heavy alcohol use declined much less than cigarette and illicit drug use; in fact, between 1988 and 2005, the percentages of military members who reported heavy alcohol use on health behavior surveys remained fairly stable (~20%).[10] Service members who are diagnosed with mental disorders – particularly alcohol abuse – should be evaluated for and counseled regarding their high risk of injury in general. In regard to assault-related injuries specifically, unit leaders and medical care providers should work together to reduce alcohol abuse (particularly binge drinking) among young service members in combat occupations, with a special focus on those who have been previously injured during fighting.

Report by Michael Boivin, CPT, MC, US Army. Data analysis by Stephen B. Taubman, PhD.

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Pneumonia/Influenza Hospitalization Risk in relation to State of Residence Prior to Military Service, U.S. Armed Forces, 1998-2007

"The morbidity from the pneumonias varied widely in the camps and these variations were apparently not influenced by the location of the camp but by the part of the country from which the troops came."[1] *Col. Victor C. Vaughan and Capt. George T. Palmer, U.S. Army, July 1919*

Historically, acute respiratory infectious diseases (particularly, pneumonias and influenza) are leading causes of non-battle-related morbidity and mortality in military (particularly, trainee) populations.[2] In recent times, almost daily throughout the year, young men and women from every state and territory of the U.S. travel to training camps to begin their military service. Each recruit "seeds" his/her training unit with respiratory infectious organisms that are endemic or were circulating in their home communities; in turn, each recruit is potentially exposed to the infectious agents that are endemic or currently circulating in the home communities of all other trainees in their units. The risk of clinically significant acute respiratory infectious diseases in such settings depends on the extents to which "seeded" agents are pathogenic and transmissible and exposed recruits are immunologically susceptible.

In general, recruits and other military personnel in closed settings (e.g., tents, barracks, ships) may be at relatively high risk of respiratory infectious diseases if they have protective immunity – acquired from natural infections and/or immunizations – to relatively few species and immunotypes of endemic or epidemic pathogens. Thus, for example, military members from remote or otherwise isolated communities may be at relatively high risk, and those from large, crowded, diverse, or otherwise highly interactive (e.g., business, transportation, tourism centers) communities may be at relatively lower risk, of respiratory infectious diseases while in military service.

Characteristics other than the urbanicity/crowding of one's prior residences or assignment locations can determine or modify the acute respiratory illness risks of military members. Consider, for example, that some respiratory infectious agents that are circumscribed in their natural distributions can have delayed clinical expressions, e.g., coccidioidomycosis in the desert southwest; histoplasmosis and blastomycosis in the Ohio and Mississippi river valleys.[3] Such infections can be acquired in an endemic area for the agent but not clinically expressed until later in a non-endemic area.[3] Also, for example, after the First Gulf War, there were concerns regarding the potential late health effects of exposures of U.S. service members to desert sand, dust, and smoke.[4]

Of further note in this regard, in 1994, Gray and colleagues reported that from 1981 to 1991, U.S. sailors and Marines from the southwest United States were at relatively high risk, and those from Pennsylvania at relatively low risk, of hospitalization for pneumonia.[5] In 1997, an analysis of hospitalizations of U.S. soldiers for pneumonia from 1990 to 1996 found significant "excesses" among those from Nevada, Arizona, California, and several others and significant "deficits" among those from Pennsylvania and others.[6] In 2003, Lange and colleagues reported that, compared to matched controls, U.S. soldiers who had been assigned to an Army installation in the Mojave desert between 1989 and 1999 were more likely to be hospitalized for pneumonia and influenza after they left (but not before or during) their desert assignments.[7]

Clearly, respiratory illness risks are determined not only by current but also past exposures and experiences. A clearer understanding of the causes and mechanisms of such relationships may increase the number and benefits of preventive countermeasures. To this end, this report examines 10-year rates of hospitalization for "pneumonia and influenza" among active component members of the U.S. military in relation to the states/territories of their residences prior to their military service.

Methods:

The surveillance period was January 1998 through December 2007. The surveillance population included all service members who served in an active component of the U.S. Armed Forces any time during the surveillance period; and had a record of an examination at a Military Entrance Processing Station (MEPS) in routine files of the Defense Medical Surveillance System (DMSS). Pneumonia hospitalizations were ascertained from medical records routinely maintained in the DMSS. A pneumonia hospitalization was defined as an inpatient diagnosis of "pneumonia and influenza" (ICD-9-CM: 480-487) either as a primary (first-listed) diagnosis or as any secondary diagnosis if the primary diagnosis was "acute respiratory infection" (ICD-9-CM: 460-466). Only one hospitalization per service member per "influenza year" (1 July-30 June) was used for analysis.

For surveillance purposes, retrospective cohorts were defined based on the state/territory of each individual's residence prior to his/her military service. The state/territory of residence prior to service was defined as the U.S. state or territory in which each service member first applied for military service. Among the prior residents of each state/territory, numbers and rates of pneumonia hospitalizations

while in military service during the surveillance period were calculated. For each state/territory-defined cohort, "excess" or "deficit" numbers of pneumonia hospitalizations were estimated by subtracting the "expected" from the observed numbers of hospitalizations among cohort members. For each state/territory-defined cohort, the "expected" hospitalizations were the number that would have occurred if the rate in the surveillance population overall had occurred in the state/territory-defined cohort of interest. Finally, for each state/territory-defined cohort, an "excess case rate" was calculated by dividing the estimated excess pneumonia hospitalizations among cohort members by the total person-years of active military service served by the cohort members during the surveillance period. For the state/territory-specific summary, those whose cohort members experienced fewer than 15 hospitalizations during the entire period were excluded (to reduce the effects/impacts of statistically unreliable estimates).

Results:

During the 10-year surveillance period (calendar years 1998-2007), there were 8,682 pneumonia hospitalizations among members of active components of the U.S. military **(Table 1).** The overall incidence rate was 85.6 cases per 100,000 person-years (p-yrs). During most influenza years, the rates of pneumonia hospitalizations were between 60 and 85 cases per 100,000 p-yrs; however, during the 2002-2003 and 2003-2004 influenza years, the rates exceeded 100 cases per 100,000 p-yrs **(Figure 1).**

During the period, pneumonia rates were highest among white non-Hispanic (93.7 per 100,000 p-yrs), lowest among black non-Hispanic (70.0 per 100,000 p-yrs), and intermediate among Hispanic (74.8 per 100,000 p-yrs) and all other (76.1 per 100,000 p-yrs) racial/ethnic subgroup members **(Figure 1).** Of note, during the 2002-2003 influenza year, there were sharp spikes in pneumonia rates among members of all racial/ethnic groups except black non-Hispanic **(Figure 1).**

In relation to age, pneumonia hospitalization rates were highest by far among service members younger than 20. Rates declined with increasing age through 35-39 years and then were higher among those older than 40. During the 2002-3 season compared to prior years, pneumonia rates were sharply higher among those younger than 25 but were relatively stable in older age groups **(Table 1).** During the 2003-4 season, pneumonia rates were remarkably high (430.0 per 100,000 p-yrs) among teenaged but not older service members **(Table 1).**

Over the entire period, rates were approximately 50% higher among males than females **(Table 1).** However, rates among females remained fairly stable, while rates among males nearly doubled from 1999-2000 (62.1 per 100,000 p-yrs) to 2003-4 (117.0 per 100,000 p-yrs) and then returned to the "baseline" rate by 2006-2007 (60.9 per 100,000 p-yrs) **(Table 1).**

Of all states and territories (with at least 15 pneumonia-related hospitalizations during the period), those with the highest pneumonia rates among former residents were Nevada (142.3 per 100,000 p-yrs) and Wyoming (142.2 per 100,000 p-yrs). Of the 10 states with the highest pneumonia

Figure 1. Rates of pneumonia hospitalizations, by self-reported race/ethnicity, active components, U.S. Armed Forces, by "influenza year," 1998-2007

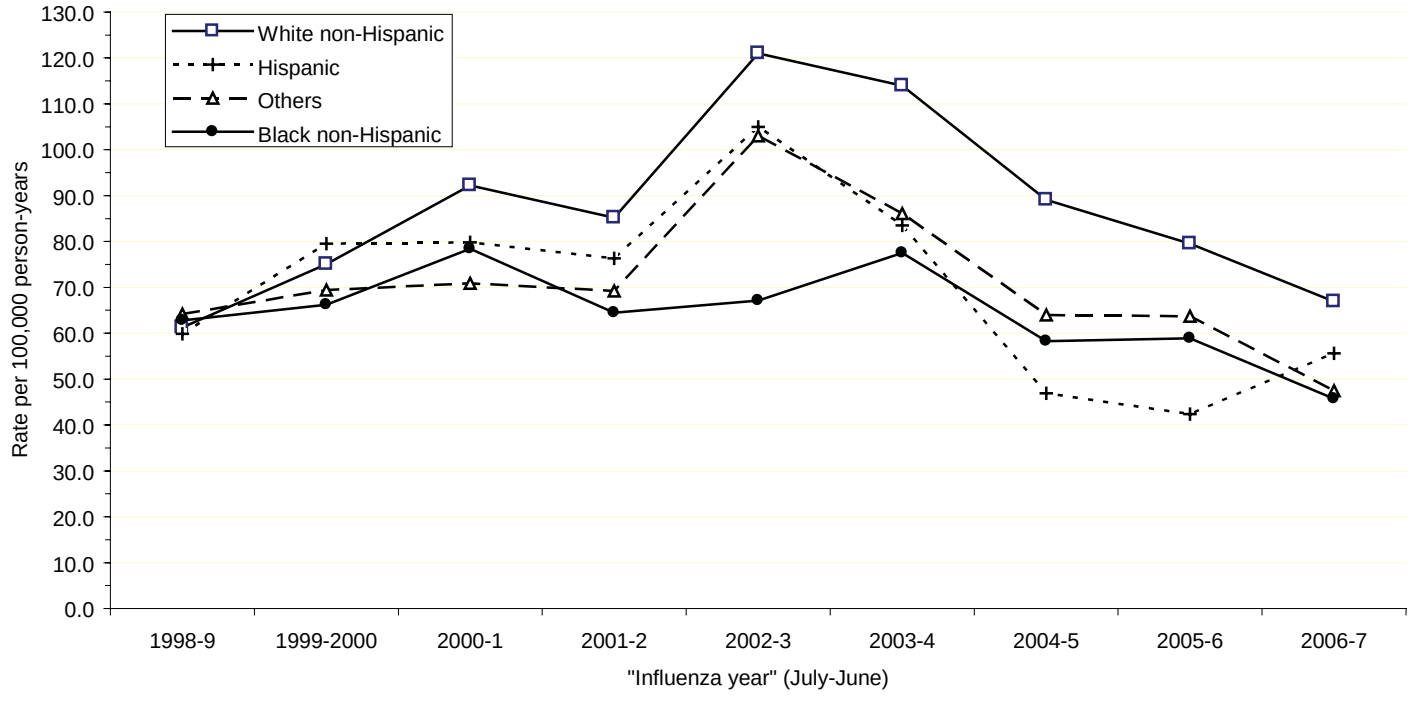


Table 1. Incident rates* of hospitalization for pneumonia and influenza, active components, U.S. Armed Forces, by "influenza year," January 1998-December 2007

	1998-1999†		1999-2000		2000-2001		2001-2002		2002-2003		2003-2004		2004-2005		2005-2006		2006-2007		Total 1998-2007±		Rate ratio, vs all others
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	
Total	600	61.6	736	73.3	904	86.4	861	78.7	1,232	107.0	1,220	101.0	931	76.6	856	70.3	745	60.1	8,682	85.6	na
Service																					
Army	293	83.6	340	94.1	402	107.0	458	118.0	616	152.0	658	157.0	509	120.0	417	96.9	433	95.7	4,470	124.0	1.92
Navy	110	43.4	130	49.8	132	48.3	116	40.0	123	40.7	134	43.1	115	37.0	94	30.5	83	27.5	1,117	42.8	0.43
Air Force	106	51.0	144	67.1	187	83.0	139	57.9	148	56.7	143	50.8	100	35.1	114	40.7	89	31.5	1,253	55.0	0.58
Marine Corps	91	64.3	122	84.2	183	124.0	148	98.2	345	221.0	285	177.0	207	127.0	231	139.0	140	82.8	1,842	132.0	1.69
Sex																					
Male	512	62.1	636	75.0	798	90.5	778	84.5	1,137	117.0	1,098	108.0	818	79.3	769	74.2	643	60.9	7,726	90.0	1.47
Female	88	59.0	100	64.3	106	64.4	82	47.5	95	52.4	122	65.3	113	61.4	87	48.2	102	56.0	955	61.3	0.68
Race ethnicity																					
White, non-hispanic	355	61.3	464	75.1	592	92.2	569	85.2	850	121.0	845	114.0	669	89.1	600	79.5	516	66.9	5,836	93.7	1.29
Black, non-hispanic	121	62.8	133	66.2	166	78.4	141	64.5	150	67.1	174	77.5	128	58.3	126	58.9	97	45.7	1,343	70.0	0.78
Hispanic	76	59.9	83	79.5	85	79.8	87	76.3	129	105.0	108	83.5	62	46.9	57	42.4	76	55.6	828	74.8	0.86
Other	48	64.2	56	69.4	61	70.9	64	69.2	103	103.0	93	86.1	72	64.0	73	63.7	56	47.5	675	76.1	0.88
Age																					
<20	166	146.0	256	212.0	411	330.0	308	244.0	476	402.0	487	430.0	301	290.0	281	296.0	214	219.0	3,049	301.0	4.88
20-24	216	52.9	266	64.0	277	64.3	310	69.0	462	97.6	389	79.8	329	69.2	307	66.7	262	57.2	3,062	75.4	0.82
25-29	140	52.3	121	46.9	126	50.4	110	44.4	141	54.5	169	62.2	132	47.2	109	38.4	114	39.5	1,267	52.7	0.55
30-34	52	40.0	63	43.4	50	30.7	86	48.7	103	55.2	90	47.2	82	43.4	72	38.9	67	36.6	718	46.4	0.50
35-39	21	50.4	23	46.9	32	54.5	32	45.9	35	41.4	63	61.4	55	45.4	50	36.4	58	39.0	399	49.1	0.55
40+	5	39.1	7	46.3	8	41.8	15	62.7	15	50.2	22	59.3	32	69.1	37	66.6	30	47.7	187	61.8	0.72
Military occupation																					
Combat	119	65	111	59.5	160	82.6	215	107	290	138	268	121	223	97	192	76.9	179	70.4	1,883	97.6	1.18
Health care	41	49.3	53	64.9	46	54.9	43	49.3	65	71.6	113	119	91	94	81	83.9	91	91.4	687	84.3	0.98
Other	440	62.2	572	77.7	698	90.8	603	74.9	877	103	839	94.7	617	69.4	583	66.9	475	53.7	6,112	82.6	0.88

*Rate per 100,000 person-years

†"Influenza year"=July through June

±Total rate for calendar years 1998-2007

Table 2. Hospitalizations for pneumonia and influenza by state of residence prior to service, with states grouped by Census Bureau divisions, active components, U.S. Armed Forces, 1998-2007

State of application to military service	Observed pneumonia cases	Rate per 100,000 p-yrs	Expected cases*	Rate ratio†	Excess/ deficit case rate‡
Total (all states)	**8,682**	**86.4**	**8682.0**	**ref**	**na**
Pacific					
Alaska	27	88.3	26.4	1.02	1.87
California	987	94.4	903.4	1.09	8.00
Hawaii	55	95.1	50.0	1.10	8.63
Oregon	130	95.7	117.4	1.11	9.26
Washington	227	96.7	202.9	1.12	10.25
	1,426	94.8	1300.2	1.10	8.36
Mountain					
Arizona	219	112.7	167.9	1.30	26.30
Colorado	174	108.8	138.3	1.26	22.34
Idaho	60	99.8	51.9	1.16	13.40
Montana	69	119.5	49.9	1.38	33.13
New Mexico	72	78.6	79.1	0.91	-7.78
Nevada	96	142.3	58.3	1.65	55.84
Utah	81	127.5	54.9	1.48	41.06
Wyoming	41	142.2	24.9	1.65	55.82
	812	112.2	625.2	1.30	25.81
West South Central					
Arkansas	97	84.5	99.2	0.98	-1.95
Louisiana	129	59.5	187.3	0.69	-26.91
Oklahoma	147	90.4	140.5	1.05	3.98
Texas	778	81.4	826.2	0.94	-5.04
	1,151	79.4	1253.3	0.92	-7.05
East South Central					
Alabama	153	67.5	195.8	0.78	-18.88
Mississippi	81	62.3	112.4	0.72	-24.13
Kentucky	105	81.8	110.9	0.95	-4.59
Tennessee	148	81.5	156.9	0.94	-4.90
	487	73.1	575.9	0.85	-13.34
South Atlantic					
Florida	617	91.8	580.5	1.06	5.43
Georgia	305	88.9	296.5	1.03	2.49
Maryland	175	91.3	165.6	1.06	4.92
North Carolina	267	83.4	276.5	0.97	-2.98
South Carolina	173	79.6	187.8	0.92	-6.80
Virginia	272	81.9	286.9	0.95	-4.49
West Virginia	57	70.7	69.6	0.82	-15.68
	1,866	86.5	1863.4	1.00	0.12
West North Central					
Iowa	59	61.7	82.6	0.71	-24.69
Kansas	76	80.5	81.6	0.93	-5.90
Missouri	194	95.3	175.9	1.10	8.88
Minnesota	107	93.2	99.2	1.08	6.77
North Dakota	16	65.4	21.1	0.76	-21.02
Nebraska	56	79.8	60.7	0.92	-6.64
South Dakota	23	63.8	31.1	0.74	-22.58
	531	83.1	552.3	0.96	-3.33
East North Central					
Illinois	311	88.9	302.4	1.03	2.46
Indiana	153	81.9	161.4	0.95	-4.52
Michigan	227	77.6	252.9	0.90	-8.84
Ohio	323	83.8	333.3	0.97	-2.66
Wisconsin	129	90.4	123.3	1.05	3.96
	1,143	84.2	1173.3	0.97	-2.23
Middle Atlantic					
New Jersey	157	82.6	164.3	0.96	-3.83
New York	405	76.1	459.7	0.88	-10.28
Pennsylvania	267	68.1	338.8	0.79	-18.32
	829	74.4	962.7	0.86	-12.01
New England					
Connecticut	73	100.6	62.7	1.16	14.15
Massachusetts	99	77.4	110.5	0.90	-9.01
Maine	35	59.2	51.1	0.68	-27.26
New Hampshire	34	79.5	36.9	0.92	-6.89
Rhode Island	17	64.8	22.7	0.75	-21.59
Vermont	17	84.0	17.5	0.97	-2.45
	275	78.8	301.5	0.91	-7.59
U.S Territories					
Puerto Rico	110	128.7	73.9	1.49	42.25

* The number of hospitalizations that would have occurred if the same rate had occurred in the subject state as in all states combined

† State-specific rate divided by rate for all states

‡ Excess cases divided by state's person-years

hospitalization rates among former residents, nine were partially or entirely west of the Rocky Mountains **(Figure 2)**. As a group, former residents of the eight Mountain states were 30% more likely to be hospitalized for pneumonias while in the military than service members overall **(Table 2)**. Of interest, compared to rates overall, pneumonia hospitalization rates were approximately 50% higher among former residents of the Virgin Islands and Puerto Rico **(Table 2, data shown for Puerto Rico only)**.

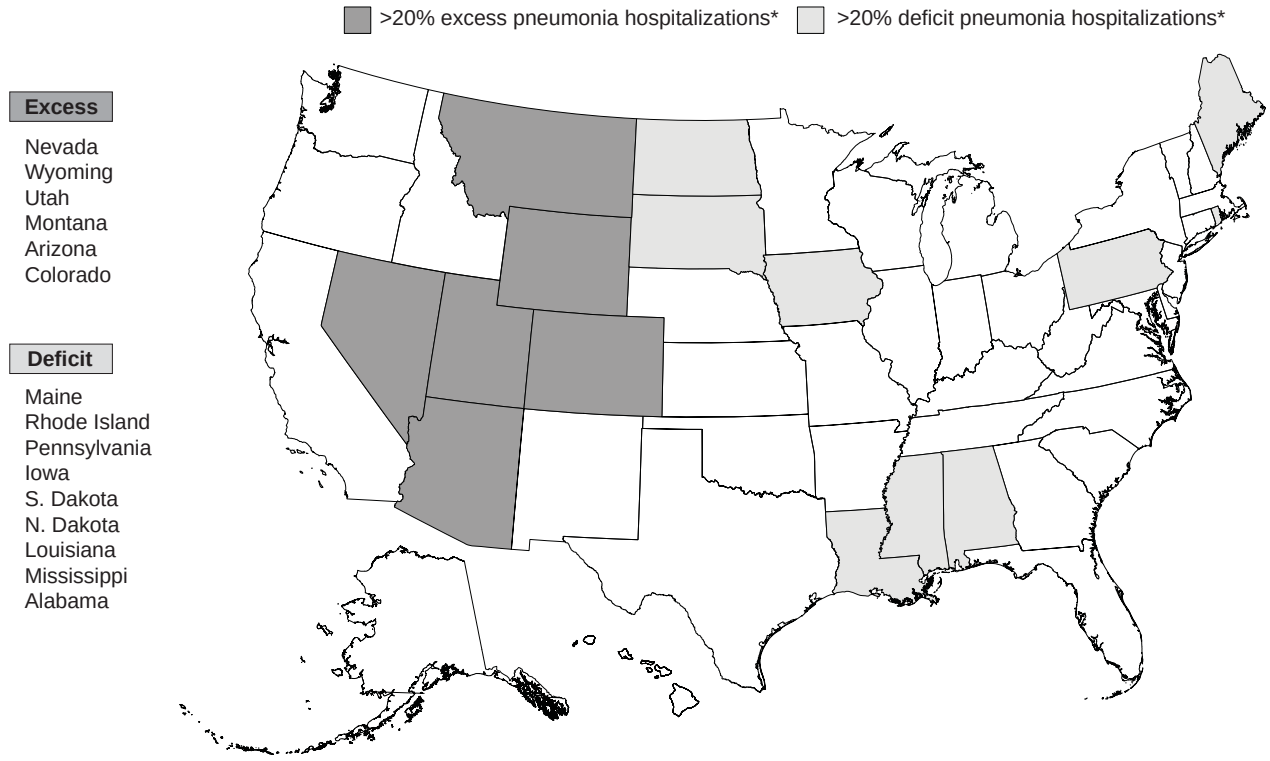
In contrast to the contiguity of states with the highest pneumonia hospitalization rates among former residents, those with the lowest rates were geographically dispersed **(Figure 2)**. For example, the rates among former residents of Maine, Louisiana, Iowa, Mississippi, South Dakota, Rhode Island, North Dakota, Alabama, and Pennsylvania were all at least 20% lower than the rate overall **(Table 2)**. As regional groups, former residents of the Middle Atlantic (New Jersey, New York, Pennsylvania) and East South Central (Alabama, Mississippi, Kentucky, Tennessee) states had pneumonia hospitalization rates 14% and 15% lower, respectively, than the rate overall **(Table 2)**.

Data analysis by Pablo Aliaga, MPH.

Editorial comment:

The report documents that service members who resided in Rocky Mountain and other western states prior to their

Figure 2. States whose residents (prior to military service) had greater than 20% "excess" or "deficit" hospitalizations for "pneumonia and influenza" during service, active members, U.S. Armed Forces, 1998-2007



*In excess/deficit of the number of pneumonia hospitalizations that would be expected based on the rate for applicants from all states combined. States whose applicants experienced fewer than 15 pneumonia hospitalizations during 1998-2007 were excluded.

military service had significantly higher rates of hospitalization for "pneumonia and influenza" while in service. In particular, former residents of Nevada and Wyoming were 66% more likely than service members in general to be hospitalized for pneumonia in military service. The finding is consistent with those of previous reports that examined pneumonia hospitalization experiences of U.S. service members during approximately 25 cumulative years of follow-up of members of different services and surveillance cohorts.[5-7] Specifically, from 1981 to 91, sailors and Marines who previously resided in southwest states (including California) were at relatively high risk of hospitalization for pneumonia while in military service.[5] Between 1990 and 1996, soldiers who entered the U.S. Army from Nevada, Arizona, and California had relatively high rates of hospitalization for pneumonia while in service.[6] Between 1989 and 1999, U.S. soldiers who were assigned to Fort Irwin, California, had relatively high hospitalization rates for pneumonia after they left – but not before or during – their assignments in the Mojave desert.[7] The consistency of the findings of higher pneumonia hospitalization rates among service members after they leave western states is striking – however, the reasons are not clear.

The limitations of this analysis should be considered when interpreting the results. For example, for surveillance purposes, the locations where individuals applied for service were considered their "states of residence prior to service." Clearly, such imputations can be invalid or misleading, e.g., many families and young adults are transient; there is no accounting for times in residence in current versus other states; and so on. Also, none of the summaries presented here were adjusted to account for the potentially confounding effects of other factors. For example, the higher pneumonia risk among prior residents of western versus other states may be related, at least in part, to differences in racial/ethnic composition, urbanicity/population density, immunization experiences prior to service, tobacco smoking habits, climate, and so on. Also, the endpoints of the analysis were administrative records of hospitalizations that included discharge diagnoses specific for "pneumonia and influenza." Such a case ascertainment method underestimates the actual numbers of pneumonias – for example, pneumonias that were diagnosed and treated in outpatient and deployed settings were not included. In addition, a large proportion of the cases summarized herein occurred among recruits: the extraordinarily high rates among teenaged males reflect this circumstance. In turn, the findings of the analysis overall may apply to recruit but not other military populations and settings.

The findings of this and recent other reports beg further investigation to explain the underlying causes/mechanisms of

the apparently increased risk in relation to prior residence in the western U.S. Until that occurs, the findings to date have no implications for or applications to current preventive or clinical policies or practices. However, results of more detailed investigations could be relevant and useful. For example, some of the pneumonias may be delayed clinical expressions of previously acquired coccidioidomycosis infections.[3] Such a circumstance would potentially increase clinical suspicion of coccidioidomycosis in service members who previously resided or served in endemic areas who present with "suspicious" pneumonias. Also, consider the possibility that adolescent and young adult residents of western states have relatively limited and sporadic exposures to the respiratory pathogens that most commonly cause pneumonias among U.S. military members in general (e.g., pneumococcus). In such a circumstance, military members from western compared to other states would potentially have robust, naturally acquired immunity to fewer serotypes of the pneumococcus (including some in the current vaccine). Because military recruits are not immunized with the polyvalent pneumococcal vaccine, and because bacterial pneumonias are more common and more virulent during influenza epidemics/pandemics, policy regarding pneumococcal vaccination – e.g., universal; based on prior residence; preparation for/response to an influenza pandemic – may merit reexamination.[8,9]

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Update: Deployment Health Assessments, U.S. Armed Forces, January-December 2007

The health protection strategy of the U.S. Armed Forces is designed to deploy healthy, fit, and medically ready forces, to minimize illnesses and injuries during deployments, and to evaluate and treat physical and psychological problems (and deployment-related health concerns) following deployment.

In 1998, the Department of Defense initiated health assessments of all deployers prior to and after serving in major operations outside of the United States.[1] In March 2005, the Post-Deployment Health Reassessment (PDHRA) program was begun to identify and respond to health concerns that persisted for or emerged within three to six months after return from deployment.[2]

This report summarizes responses to selected questions on deployment health assessments completed since 2003. In addition, it documents the natures and frequencies of changes in responses from before to after deployments.

Methods:

Completed deployment health assessment forms are transmitted to the Armed Forces Health Surveillance Center (Provisional)(AFHSC(P)) where they are incorporated into the Defense Medical Surveillance System (DMSS).[3] In the DMSS, data recorded on health assessment forms are integrated with data that document demographic and military characteristics and medical encounters (e.g., hospitalizations, ambulatory visits) at fixed military and other (contracted care) medical facilities of the Military Health System. For this analysis, DMSS was searched to identify all pre (DD2795) and post (DD2796) deployment health assessment forms completed since 1 January 2003 and all post-deployment health reassessment (DD2900) forms completed since 1 August 2005.

Results:

Since January 2003, 1,887,414 pre-deployment health assessment forms, 1,897,664 post-deployment health assessment forms, and 483,205 post-deployment health reassessment forms were completed at field sites, transmitted to the AFHSC(P), and integrated into the DMSS **(Figure 1).** Throughout the period, there were intervals of approximately 2-4 months between peaks of pre-deployment and post-deployment health assessments (that were completed by different cohorts of deployers) **(Figure 1).** Post-deployment health reassessments rapidly increased between February and May 2006 **(Figure 1).** Since then, numbers of reassessment forms per month have been relatively stable (reassessment forms per month, January-December 2007: mean: 22,900; range: 16,318-36,335) **(Figure 1, Table 1).**

Between January and December 2007, nearly three-fourths (73.5%) of deployers rated their "health in general" as "excellent" or "very good" during pre-deployment health assessments **(Figure 2).** During the same period, only 60.0% and 52.3% of redeployers rated their general health as "excellent" or "very good" during post-deployment assessments and post-deployment reassessments, respectively **(Figure 2).**

From pre-deployment to post-deployment to post-deployment reassessments, there were sharp increases in the proportions of deployers who rated their health as "fair" or "poor" **(Figure 2).** For example, prior to deployment, approximately one of 40 (2.7%)

Figure 1. Total deployment health assessment and reassessment forms, by month, U.S. Armed Forces, January-December 2007

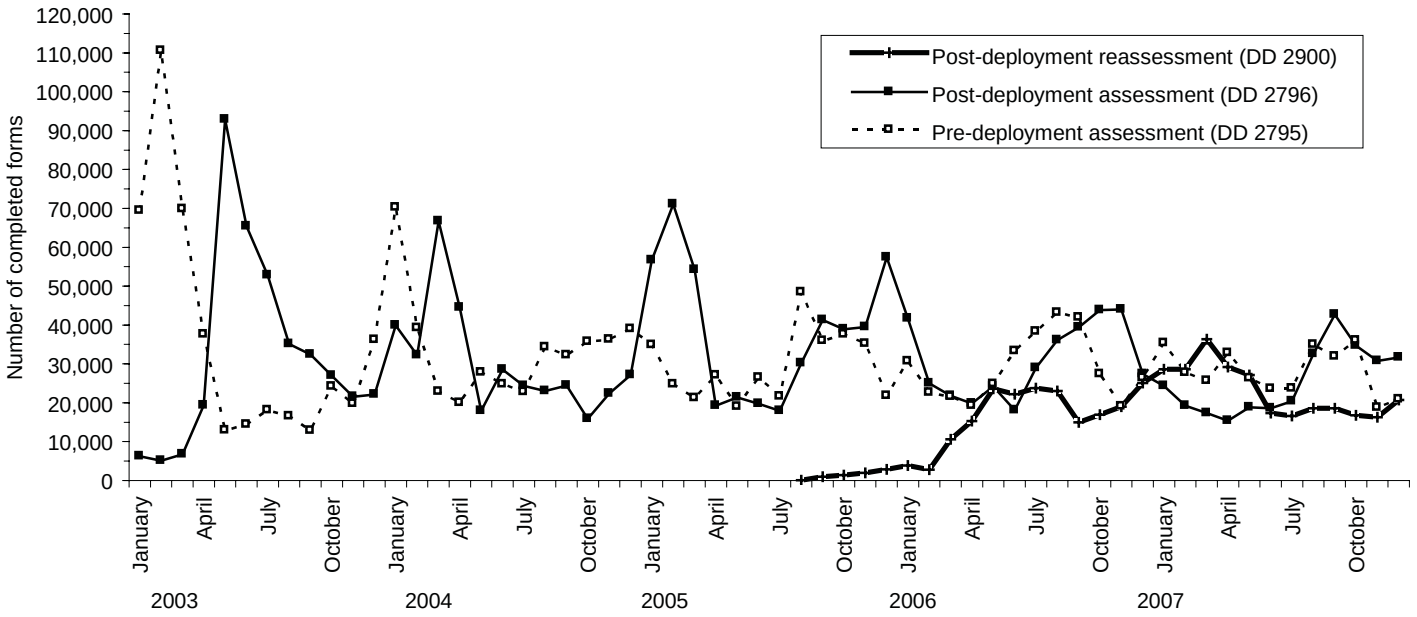


Table 1. Deployment-related health assessment forms, by month, U.S. Armed Forces, January-December 2007

	Pre-deployment assessment DD2795		Post-deployment assessment DD2796		Post-deployment reassessment DD2900	
	No.	%	No.	%	No.	%
Total	**337,595**	**100**	**306,525**	**100**	**274,794**	**100**
2007						
January	35,345	10.5	24,327	7.9	28,615	10.4
February	27,736	8.2	19,258	6.3	28,604	10.4
March	25,640	7.6	17,326	5.7	36,335	13.2
April	32,798	9.7	15,385	5.0	29,191	10.6
May	26,299	7.8	18,844	6.1	27,105	9.9
June	23,578	7.0	18,574	6.1	17,366	6.3
July	23,650	7.0	20,365	6.6	16,637	6.1
August	34,975	10.4	32,590	10.6	18,594	6.8
September	31,898	9.4	42,725	13.9	18,549	6.8
October	36,047	10.7	34,712	11.3	16,794	6.1
November	18,714	5.5	30,739	10.0	16,318	5.9
December	20,915	6.2	31,680	10.3	20,686	7.5

deployers rated their health as "fair" or "poor"; however, 3-6 months after returning from deployment (during post-deployment reassessments), approximately one of seven (13.9%) respondents rated their health as "fair" or "poor" **(Figure 2).**

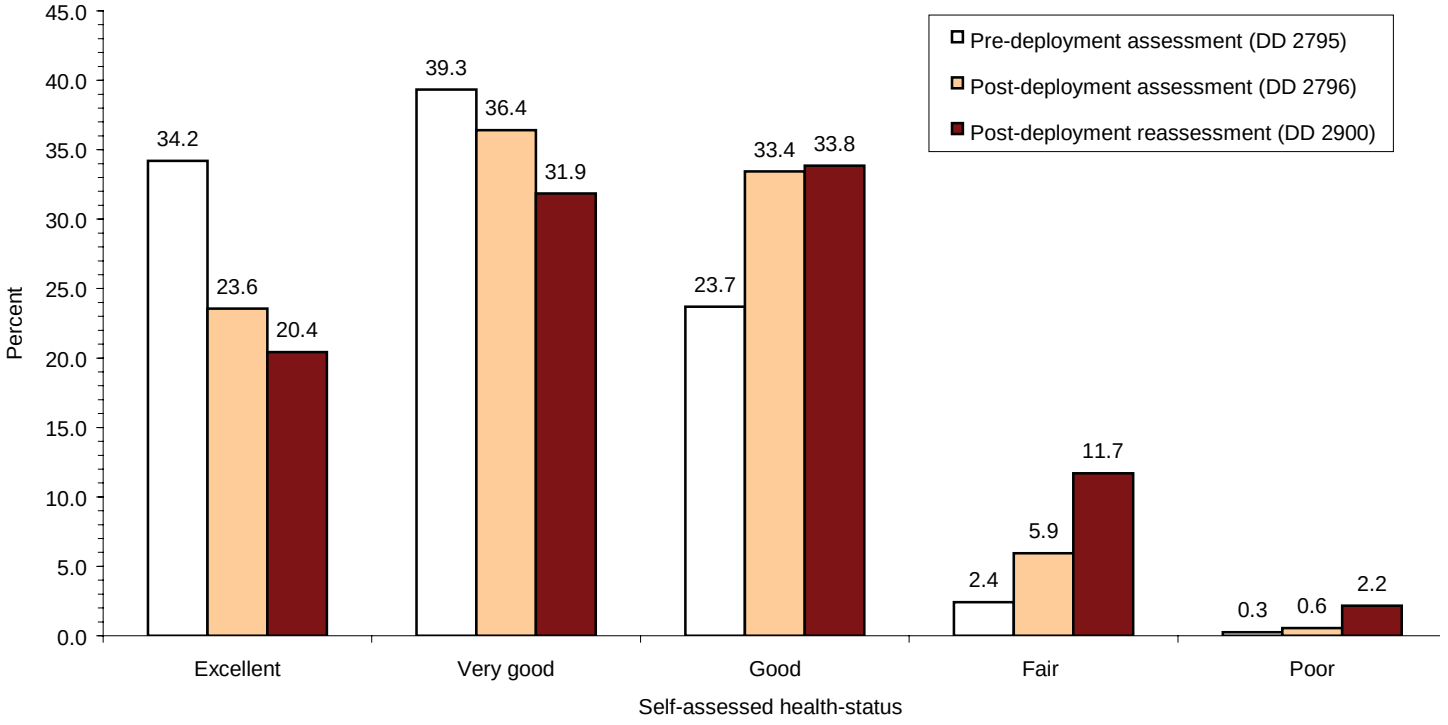
From January 2003 through December 2007, the proportion of deployers who assessed their general health as "fair" or "poor" before deploying remained consistently low (% "fair" or "poor" "health in general," pre-deployment health assessments, January 2003-December 2007, by month: mean: 2.4% [range: 1.5-3.4%]) **(Figure 3).** During the same period, the proportion of redeployers who assessed their general health as "fair" or "poor" around times of redeployment was consistently and clearly higher than before deploying (% "fair" or "poor" "health in general," post-deployment health assessments, January 2003-December 2007, by month: mean: 6.9% [range: 3.0-10.2%]) **(Figure 3).** Finally, from January 2006 through December 2007, the proportion of redeployers who assessed their general health as "fair" or "poor" 3-6 months after redeploying was sharply higher than at redeployment (% "fair" or "poor" "health in general," post-deployment health reassessments, January 2006-December 2007, by month: mean: 13.5% [range: 11.8-17.2%]) **(Figure 3).**

More than half of service members who rated their overall health before deployment chose a different descriptor after deploying, but usually by a single category (on a five category scale). The proportions of deployers whose self-rated health improved by more than one category from pre-deployment to reassessment remained relatively stable between January and December 2007 (mean: 1.3%, range:1.0-1.6%) **(Figure 4).** The proportions of service members whose self-assessed health declined by more than one category was relatively stable between January and March 2007, declined between March and September 2007, and increased in October 2007 (mean: 16.3, range 13.6-19.0%) **(Figure 4).**

In general, on post-deployment assessments and reassessments, members of Reserve components and members of the Army were much more likely than their respective counterparts to report mental health-related symptoms and health and exposure-related concerns – and in turn, to have indications for medical and mental health follow-ups ("referrals") **(Table 2).**

Among Reserve versus active component members, relative

Figure 2. Percent distributions of self-assessed health status as reported on deployment health assesment forms, U.S. Armed Forces, January-December 2007



excesses of health-related concerns and provider-indicated referrals were much greater 3-6 months after redeployment (DD2900) than either before deploying (DD2795) or at redeployment (DD2796) **(Table 2, Figures 5,6).** For example, among both active and Reserve component members of all Services, mental or behavioral health referrals were more common after deployment than before **(Figure 5).** However, from the time of redeployment to 3-6 months later, mental health referrals sharply increased among Reserve component members of the Army, Navy, and Marine Corps (but not Air Force) **(Table 2, Figure 5).** Of note in this regard, the largest absolute increase in mental health referrals from redeployment to 3-6 months later was for Reserve component members of the Army (post-deployment: 4.9%; reassessment: 12.0%) **(Table 2, Figure 5).**

Finally, over the past three years, Reserve component members have been approximately twice as likely as active to report "exposure concerns" on post-deployment health assessments (DD2796) (%"exposure concerns," post-deployment assessments, by month, January-December 2007: Reserve: mean: 27.0%, range: 22.7-32.6%; active: mean: 14.6%; range: 9.8-18.9%) **(Figures 6,7).** Sharply higher proportions of both Reserve and active component members endorsed exposure concerns 3-6 months after (DD2900) compared to around times (DD2796) of redeployment (%"exposure concerns," post-deployment reassessments, by month, January-December 2007: Reserve: mean: 35.1%, range: 31.0-39.7%; active: mean: 20.2%; range: 18.1-23.6%) **(Figure 7).**

Editorial comment:

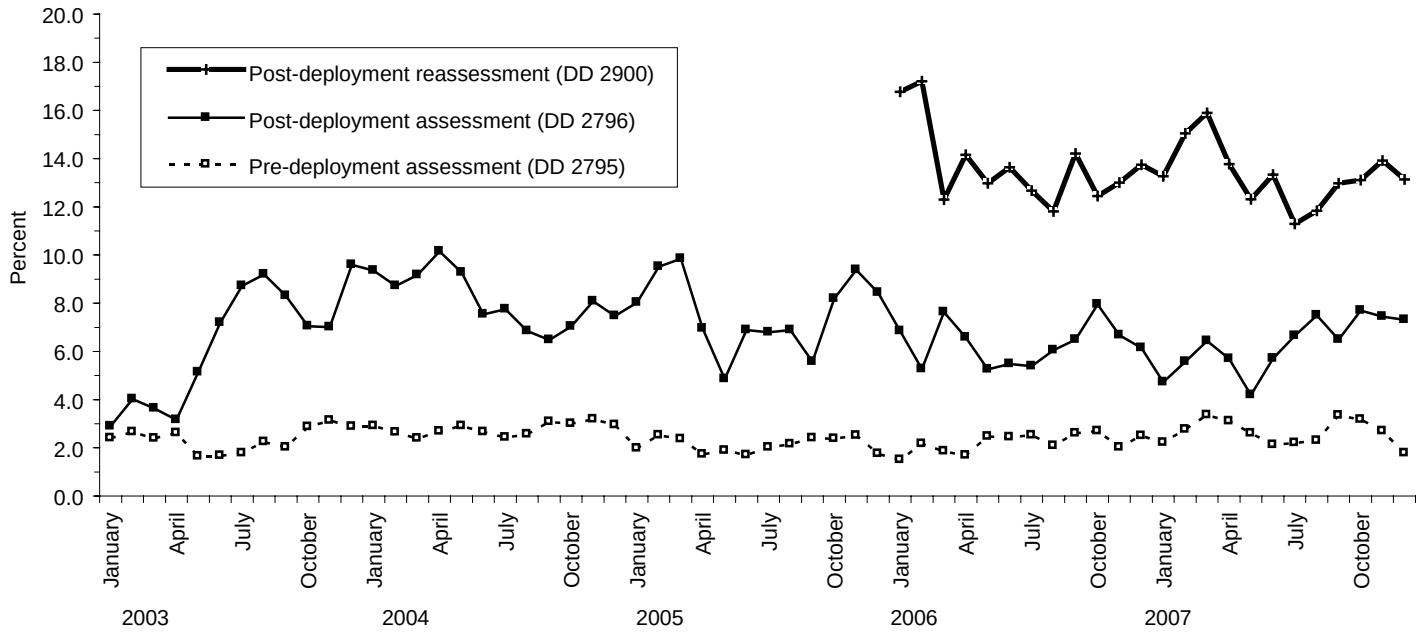
In general, since 2003, proportions of U.S. deployers to Iraq and Afghanistan who report medical or mental health-related symptoms (or have indications for medical or mental health referrals) on deployment-related health assessments increased from pre-deployment to post-deployment to 3-6 months post-deployment, are higher among members of the Army than the other Services, and are higher among Reserve than the active component members.

Regardless of the Service or component, deployers often rate their general health worse when they return compared to before deploying. This is not surprising because deployments are inherently physically and psychologically demanding. Clearly, there are many more – and more significant – threats to the physical and mental health of service members when they are conducting or supporting combat operations away from their families in hostile environments compared to when serving at their permanent duty stations (active component) or when living in their civilian communities (Reserve component).

However, many redeployed service members rate their general health worse 3-6 months after returning from deployment compared to earlier. This finding may be less intuitively understandable. Symptoms of post-traumatic stress disorder (PTSD) may emerge or worsen within several months after a life threatening experience (such as military service in a war zone). PTSD among U.S. veterans of combat duty in Iraq has been associated with higher rates of physical health problems after redeployment.[4] The post-deployment health reassessment at 3-6 months post-deployment is designed to detect service members with symptoms not only of PTSD but also persistent or emerging deployment-related medical and mental health problems.

Among British veterans of the Iraq war, Reservists reported

Figure 3. Proportion of deployment health assessment forms with self-assessed health status as "fair" or "poor", U.S. Armed Forces, January 2003-December 2007



more "ill health" than their active counterparts.[5] Roles, traumatic experiences, and unit cohesion while deployed were associated with medical outcomes after returning; however, PTSD symptoms were more associated with problems at home (e.g, reintegration into family, work, and other aspects of civilian life) than with events in Iraq.[5] The finding may explain, at least in part, the large differences in prevalences of mental health symptoms, medical complaints, and provider-indicated mental health referrals among Reserve compared to active members — particularly in the Army and Navy — 3-6 months after returning from deployment compared to earlier.

Post-deployment health assessments may be more reliable several months after redeployment compared to earlier. Commanders, supervisors, family members, peers, and providers of health care to redeployed service members should be alert to emerging or worsening symptoms of physical and psychological problems for several months, at least, after returning from deployment.

Figure 4. Proportion of service members whose self-assessed health status improved ("better") or declined ("worse") (by 2 or more categories on 5-category scale) from pre-deployment to reassessment, by month, U.S. Armed Forces, January-December 2007

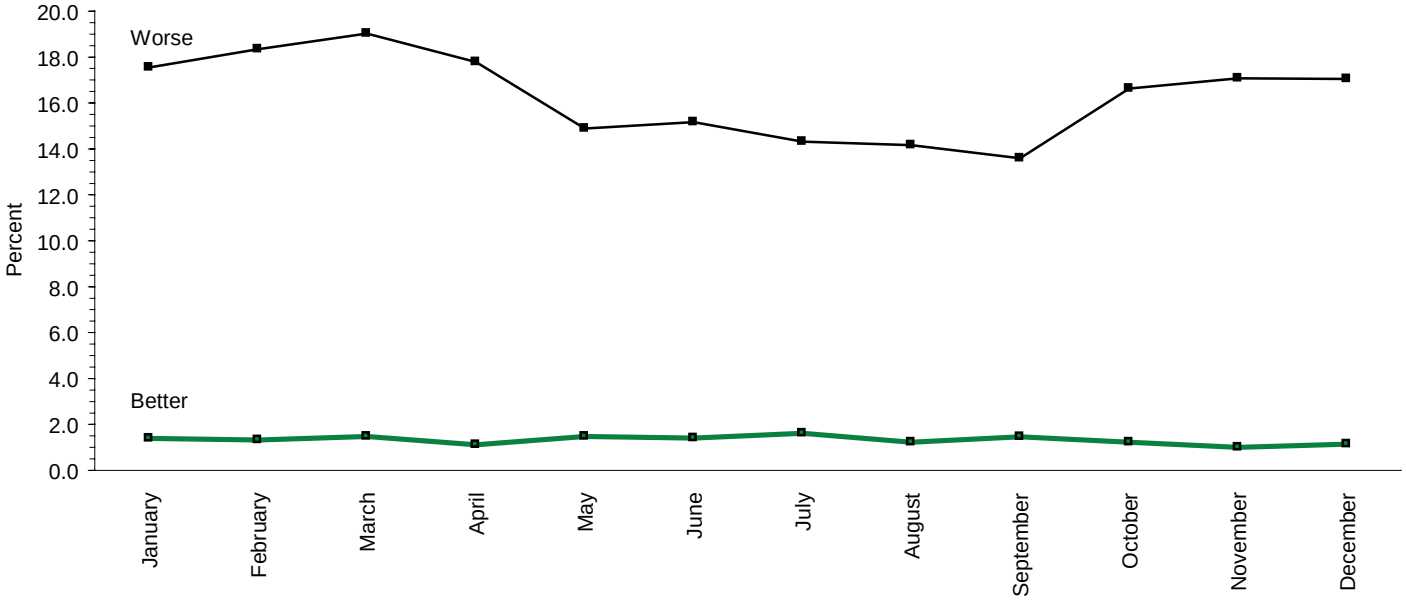


Figure 5. Percent of deployers with mental or behavioral health referrals, by Service and component, by timing of health assessment, U.S. Armed Forces, January-December 2007

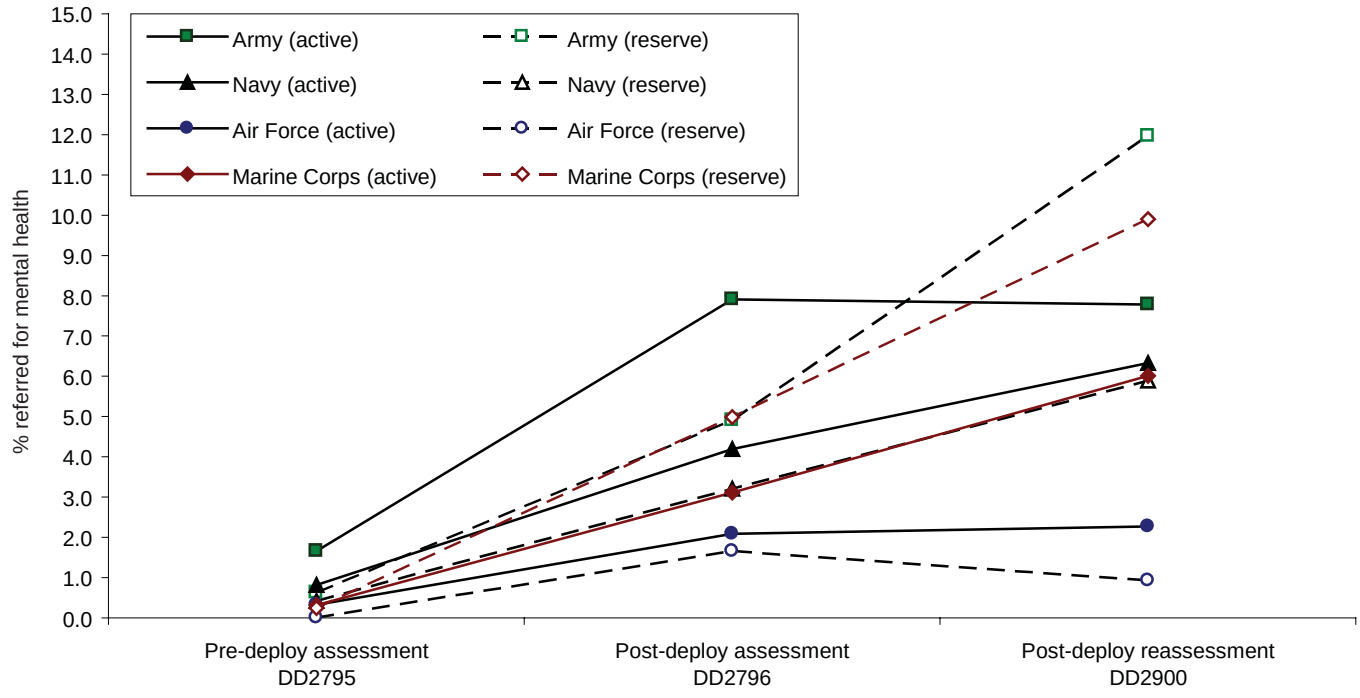


Table 2. Percentage of service members who endorsed selected questions/received referrals on health assessment forms, U.S. Armed Forces, January-December 2007

	Army			Navy			Air Force			Marine Corps			All service members		
Active component	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900
	n=147,864	n=125,808	n=86,094	n=16,376	n=11,392	n=7,634	n=62,187	n=56,918	n=54,187	n=30,113	n=32,123	n=24,074	n=256,540	n=226,241	n=171,989
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	4.4	8.3	18.2	1.7	3.7	6.8	0.5	2.1	5.0	1.7	3.1	10.2	3.0	5.8	12.4
Health concerns, not wound or injury	13.3	27.1	42.1	5.3	12.0	22.7	4.7	14.9	16.6	4.1	9.4	27.6	9.6	20.7	31.2
Health worse now than before deployed	na	22.9	28.9	na	10.1	15.4	na	7.9	10.3	na	12.0	20.1	na	16.9	21.2
Exposure concerns	na	21.8	26.4	na	11.4	13.7	na	6.3	13.0	na	7.7	18.5	na	15.4	20.5
PTSD symptoms (2 or more)	na	18.0	18.1	na	6.0	9.6	na	2.8	3.1	na	7.7	12.9	na	12.1	12.3
Depression symptoms	na	34.0	10.7	na	20.3	7.3	na	9.0	2.8	na	26.1	9.8	na	25.9	7.9
Referral indicated by provider (any)	7.7	31.8	25.5	7.1	22.3	21.3	1.6	12.1	8.8	3.6	15.9	21.7	5.7	24.2	19.5
Mental health referral indicated*	1.7	7.9	7.8	0.8	4.2	6.3	0.3	2.1	2.3	0.3	3.1	6.0	1.1	5.6	5.7
Medical visit following referral†	95.2	99.3	99.0	90.0	87.3	93.0	80.0	94.1	96.1	63.0	76.7	89.8	91.7	93.1	97.5
	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900	Pre-deploy DD2795	Post-deploy DD2796	Reassessmt DD2900
Reserve component	n=56,804	n=61,097	n=72,458	n=4,053	n=2,555	n=6,365	n=17,413	n=14,986	n=18,883	n=2,439	n=1,523	n=5,099	n=80,709	n=80,161	n=102,805
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
General health "fair" or "poor"	2.1	10.4	19.0	0.8	5.6	9.2	0.3	2.1	4.5	2.2	4.5	13.1	1.6	8.6	15.5
Health concerns, not wound or injury	15.2	37.9	57.1	3.6	25.9	40.7	1.8	22.0	18.3	4.1	20.7	46.0	11.4	34.3	48.4
Health worse now than before deployed	na	29.4	37.9	na	18.1	24.6	na	11.1	10.8	na	24.0	28.1	na	25.5	31.6
Exposure concerns	na	32.9	40.3	na	29.7	30.0	na	9.4	18.4	na	19.0	29.8	na	28.1	35.2
PTSD symptoms (2 or more)	na	14.6	23.9	na	6.4	12.7	na	1.9	3.3	na	11.1	21.2	na	11.9	19.3
Depression symptoms	na	28.4	12.4	na	20.2	8.2	na	8.0	2.6	na	34.7	9.9	na	24.5	10.2
Referral indicated by provider (any)	10.9	30.8	47.5	5.6	23.6	33.1	0.3	11.8	24.8	3.9	25.9	50.1	8.1	26.9	42.5
Mental health referral indicated*	0.6	4.9	12.0	0.4	3.2	5.9	0.0	1.7	0.9	0.2	5.0	9.9	0.5	4.2	9.5
Medical visit following referral†	98.8	98.4	29.1	98.1	95.1	30.1	50.0	57.0	24.7	27.3	61.5	21.6	98.3	91.8	28.1

*Includes behavioral health, combat stress and substance abuse referrals
†Record of inpatient or outpatient visit within 6 months after referral

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2. Assistant Secretary of Defense (Health Affairs). Memorandum for the Assistant Secretaries of the Army (M&RA), Navy (M&RA), and Air Force (M&RA), subject: Post-deployment health reassessment (HA policy: 05-011), dated 10 March 2005. Washington, DC. http://www.ha.osd.mil/policies/2005/05-011.pdf. Accessed 18 October 2006.
3. Rubertone MV, Brundage JG. The Defense Medical Surveillance System and the Department of Defense Serum Repository: Glimpses of the Future of Public Health Surveillance. *Am J Public Health* 2002 Dec;92,(12):1900-04.
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5. Browne T, Hull L, Horn O, et al. Explanations for the increase in mental health problems in UK reserve forces who have served in Iraq. *Br J Psychiatry*. 2007 Jun;190:484-489.

Figure 6. Ratio of percents of deployers who endorse selected questions, Reserve versus active component, on pre-deployment health assessments (DD2795) and post-deployment health reassessments (DD2900), U.S. Armed Forces, January-December 2007

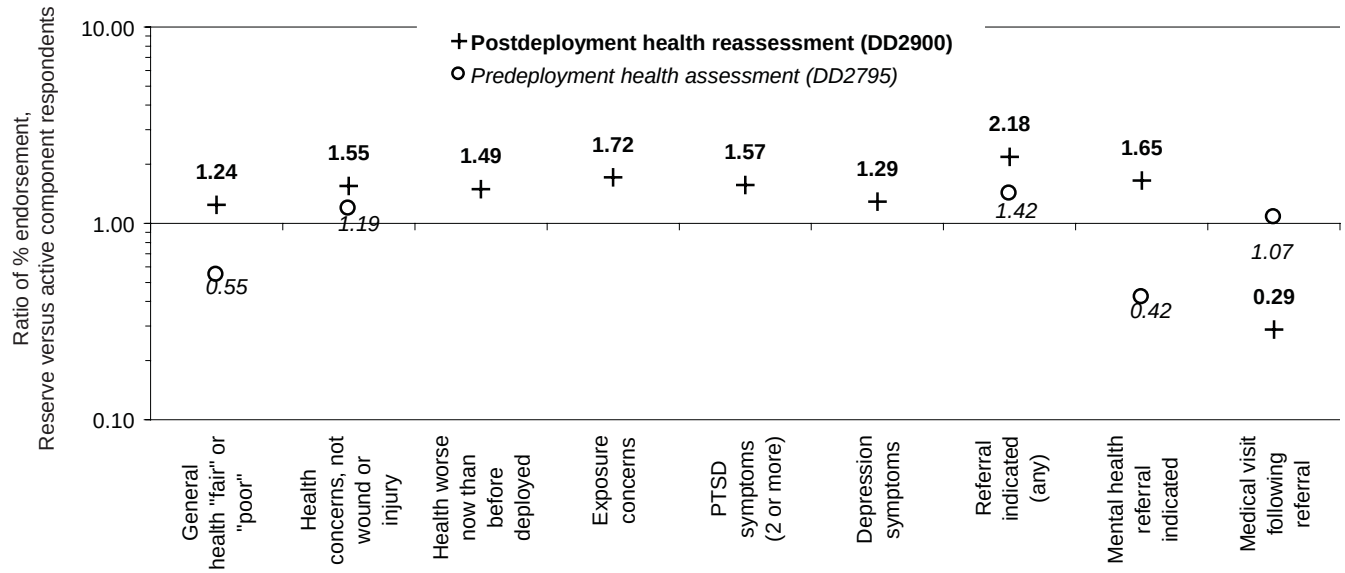
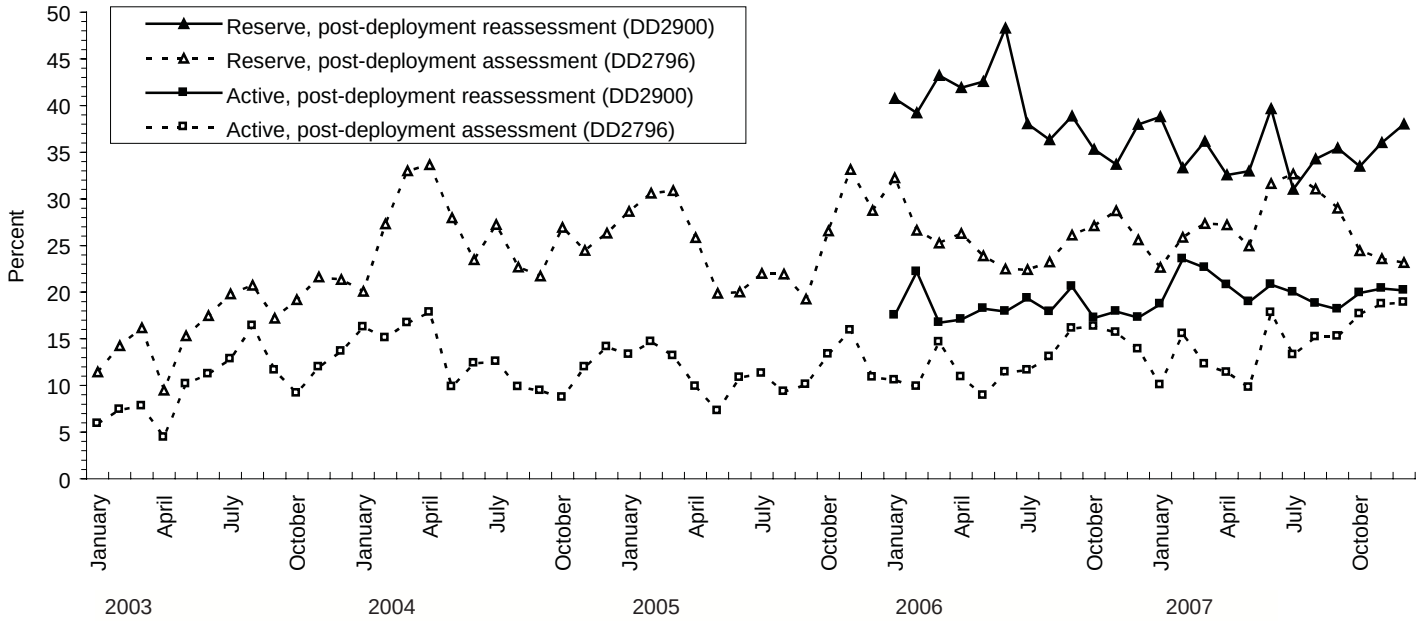
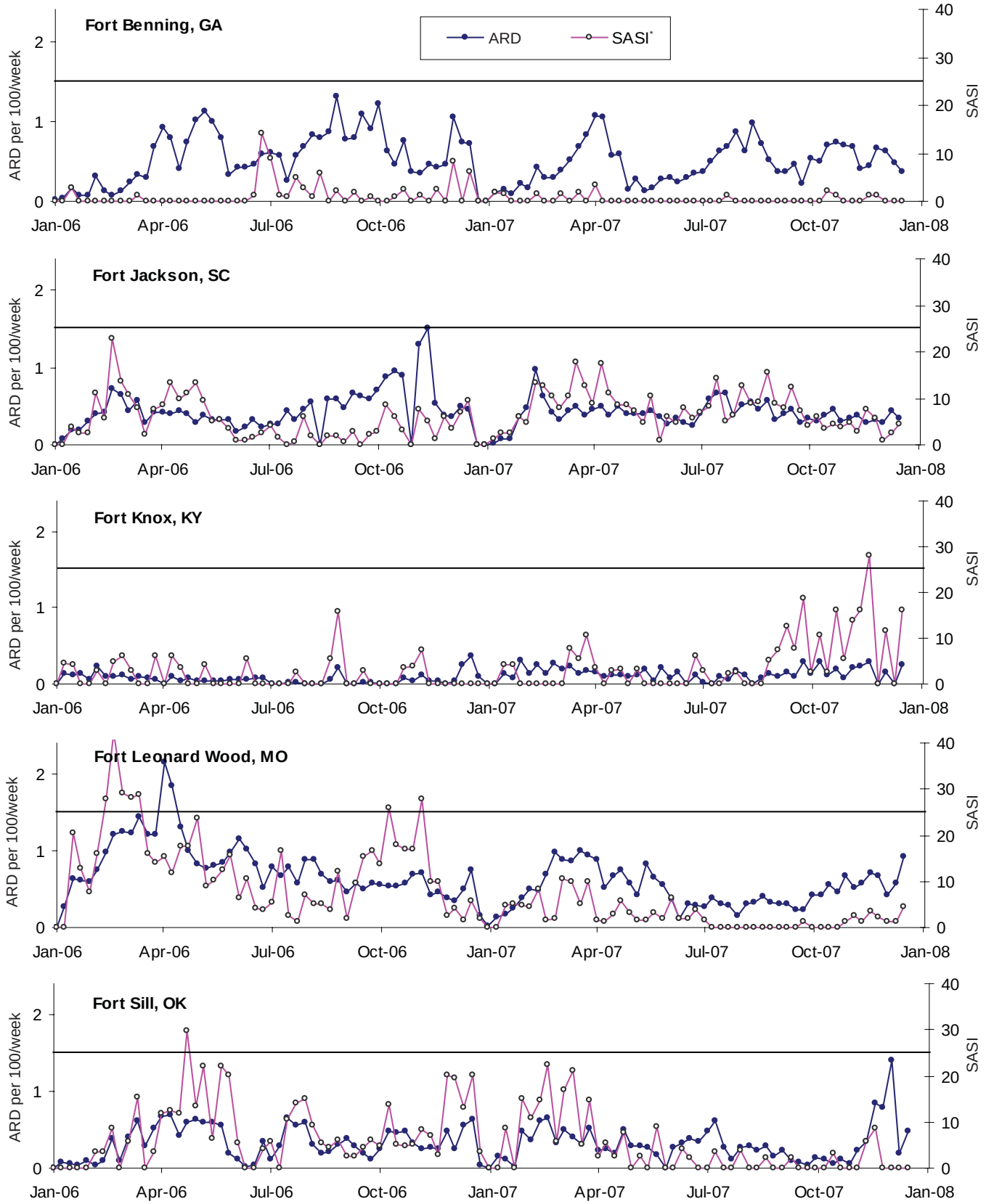


Figure 7. Proportion of service members who endorse exposure concerns on post-deployment health assessments, U.S. Armed Forces, 2003-2007



Acute respiratory disease (ARD) and streptococcal pharyngitis rates (SASI*), basic combat training centers, U.S. Army, by week, January 2006-January 2008



* Streptococcal-ARD surveillance index (SASI) = ARD rate x % positive culture for group A streptococcus
ARD rate = cases per 100 trainees per week
ARD rate ≥ 1.5 or SASI ≥ 25.0 for 2 consecutive weeks are surveillance indicators of epidemics

Sentinel reportable events for service members and beneficiaries at U.S. Air Force medical facilities, cumulative numbers* for calendar years 2006 and 2007

Air Force

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Air Combat Cmd	707	1,415	1	3	.	4	2	10	.	.	.	.	1	7	2	7
Air Education & Training Cmd	343	727	.	1	1	1	7	18	.	17	.	.	2	4	3	10
Lackland, TX	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
USAF Academy, CO	83	48	.	.	.	.	.	2	.	.	.	.	.	.	.	.
Air Force Dist. of Washington	43	33	.	.	.	.	.	.	.	1	.	.	.	1	.	.
Air Force Materiel Cmd	340	551	1	.	1	2	2	20	.	2	.	.	2	.	2	2
Air Force Special Ops Cmd	79	175	.	.	.	.	5	3	5	1	.	.	.	.	.	.
Air Force Space Cmd	220	305	.	2	.	1	3	7	.	1	.	.	1	2	.	1
Air Mobility Cmd	463	731	.	1	3	1	5	13	8	2	.	.	4	4	1	3
Pacific Air Forces	330	515	.	1	1	2	5	4	.	1	.	.	2	5	.	12
PACAF Korea	115	88	.	.	.	.	.	.	.	.	.	.	.	.	.	1
U.S. Air Forces in Europe	211	276	.	3	1	.	.	1	.	1	.	.	1	3	2	.
Total	**2,934**	**4,864**	**2**	**11**	**7**	**11**	**29**	**78**	**13**	**26**	**0**	**0**	**13**	**26**	**10**	**36**

*Events reported by January 7, 2007 and 2008

†Seventy medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, May 2004.

Note: Completeness and timeliness of reporting vary by facility.

Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Air Combat Cmd	1	11	.	.	620	961	41	85	3	6	.	3	3	.	1	6
Air Education & Training Cmd	.	2	1	.	250	559	38	81	1	2	.	.	.	1	.	1
Lackland, TX	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
USAF Academy, CO	.	.	1	.	38	41	.	3	.	.	.	.	2	.	1	.
Air Force Dist. of Washington	.	.	.	.	33	29	4	1	.	.	.	.	.	.	.	.
Air Force Materiel Cmd	1	5	1	2	230	437	45	56	1	2	.	.	.	.	.	.
Air Force Special Ops Cmd	.	.	.	.	53	139	14	20	.	.	.	.	.	.	.	12
Air Force Space Cmd	1	2	.	.	177	264	6	16	.	1	.	.	1	.	.	.
Air Mobility Cmd	6	7	1	.	348	615	18	51	1	1	.	.	.	.	.	3
Pacific Air Forces	.	2	2	1	285	425	21	35	.	.	.	.	2	.	.	.
PACAF Korea	.	.	.	.	95	73	12	3	.	3	.	.	.	.	.	.
U.S. Air Forces in Europe	2	3	1	.	140	221	15	15	1	.	.	.	.	.	.	.
Total	**11**	**32**	**7**	**3**	**2,269**	**3,764**	**214**	**366**	**7**	**15**	**0**	**3**	**8**	**1**	**2**	**22**

‡Primary and secondary.

§Urethritis, non-gonococcal (NGU).

Sentinel reportable events for service members and beneficiaries at U.S. Army medical facilities, cumulative numbers* for calendar years 2006 and 2007

Army

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
NORTH ATLANTIC																
Washington, DC Area	289	297	5	2	3	4	4	7	.	1	.	.	1	6	.	1
Aberdeen, MD	11	19	.	.	.	1	.	.	.	.	.	.	.	.	.	.
FT Belvoir, VA	345	238	11	8	1	2	11	8	3	4	.	.	.	.	5	1
FT Bragg, NC	1,763	1,343	13	2	.	.	35	20	.	2	.	.	.	.	.	.
FT Drum, NY	218	246	.	.	.	.	.	.	.	.	.	.	.	2	.	.
FT Eustis, VA	232	210	.	.	.	.	1	1	.	.	.	.	.	.	.	.
FT Knox, KY	300	286	.	4	2	.	1	2	2	2	.	.	.	2	.	.
FT Lee, VA	366	379	.	.	.	1	.	1	.	1	.	.	.	3	4	1
FT Meade, MD	111	96	.	.	.	.	2	1	.	.	.	.	1	.	.	.
West Point, NY	56	46	.	.	.	.	1	.	.	.	.	.	3	3	.	.
GREAT PLAINS																
FT Sam Houston, TX	543	565	.	1	2	3	12	8	2	1	.	.	2	4	1	7
FT Bliss, TX	322	213	.	.	1	.	2	.	1	.	.	.	5	.	.	.
FT Carson, CO	830	696	1	3	3	5	5	2	.	1	.	.	.	.	.	.
FT Hood, TX	1,763	2,219	7	15	3	3	12	19	13	10	.	.	.	.	1	1
FT Huachuca, AZ	100	98	.	1	.	.	11	6	.	.	.	.	.	.	.	.
FT Leavenworth, KS	57	50	.	1	4	.	.	.	.	2	.	.	.	.	.	.
FT Leonard Wood, MO	326	364	1	.	6	1	2	2	.	1	.	.	.	.	6	11
FT Polk, LA	234	245	2	.	1	3	3	5	.	.	.	.	.	.	.	1
FT Riley, KS	256	326	2	2	.	.	.	5	.	.	.	.	.	.	.	2
FT Sill, OK	229	183	.	.	.	.	1	2	.	.	.	.	.	.	2	1
SOUTHEAST																
FT Gordon, GA	479	731	.	.	.	.	.	7	.	4	.	.	11	1	1	.
FT Benning, GA	485	432	3	1	1	1	13	7	2	7	.	.	.	1	.	1
FT Campbell, KY	685	761	1	1	.	.	1	.	.	9	.	.	.	.	.	.
FT Jackson, SC	271	325	.	.	.	.	.	2	.	.	.	.	1	1	1	.
FT Rucker, AL	89	93	1	1	.	.	5	2	.	13	.	.	.	2	.	.
FT Stewart, GA	1,010	1,052	.	2	.	.	9	30	20	10	.	.	12	4	3	2
WESTERN																
FT Lewis, WA	603	861	.	3	.	5	5	3	.	1	.	.	1	.	1	1
FT Irwin, CA	103	109	1	1	.	.	.	2	1	1	.	.	.	.	.	.
FT Wainwright, AK	194	234	.	.	.	.	4	1	.	.	.	.	.	.	1	.
OTHER LOCATIONS																
Hawaii	942	849	39	25	1	2	13	20	2	.	.	.	.	1	2	.
Germany	1,007	891	13	6	3	1	23	9	.	13	.	.	2	.	1	1
Korea	671	640	.	.	.	.	.	.	.	.	.	.	3	.	5	2
Total	**14,890**	**15,097**	**100**	**79**	**31**	**32**	**176**	**172**	**46**	**83**	**0**	**0**	**42**	**30**	**34**	**33**

*Events reported by January 7, 2007 and 2008

†Seventy medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, May 2004.

Note: Completeness and timeliness of reporting vary by facility.

Sentinel reportable events for service members and beneficiaries at U.S. Army medical facilities, cumulative numbers* for calendar years 2006 and 2007

Army

Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
NORTH ATLANTIC																
Washington, DC Area	3	15	2	5	162	159	28	28	5	8	1	.	.	.	.	.
Aberdeen, MD	.	.	.	.	8	10	1	3	.	.	.	.	.	.	.	.
FT Belvoir, VA	2	1	.	1	198	170	46	23	.	2	.	.	.	.	.	.
FT Bragg, NC	2	1	21	4	1,223	919	187	175	4	2	130	81	2	1	135	132
FT Drum, NY	.	2	.	2	193	183	24	26	.	.	.	.	.	.	.	.
FT Eustis, VA	.	1	.	1	155	168	48	15	.	.	.	.	.	.	19	10
FT Knox, KY	6	1	2	1	208	222	50	35	2	.	.	.	5	6	11	2
FT Lee, VA	.	3	.	.	283	289	49	43	.	4	.	.	.	1	3	17
FT Meade, MD	.	1	.	.	93	77	13	10	.	1	1	2	.	1	.	.
West Point, NY	16	24	.	.	26	14	.	.	.	.	.	.	1	.	2	.
GREAT PLAINS																
FT Sam Houston, TX	.	1	1	.	314	297	61	69	5	4	.	.	.	.	9	6
FT Bliss, TX	.	1	.	.	238	164	56	36	5	1	.	.	.	.	1	.
FT Carson, CO	.	.	.	2	596	499	104	72	.	1	42	15	1	1	.	.
FT Hood, TX	.	2	1	5	1,187	1,610	281	321	.	2	47	108	.	.	32	27
FT Huachuca, AZ	.	.	.	.	77	72	11	18	.	1	.	.	1	.	.	.
FT Leavenworth, KS	.	1	.	.	47	41	6	5	.	.	.	.	.	.	.	.
FT Leonard Wood, MO	.	1	.	1	232	255	20	34	.	1	.	.	.	2	15	20
FT Polk, LA	.	.	.	15	127	130	41	43	2	1	.	.	.	.	58	43
FT Riley, KS	.	.	.	.	205	241	35	21	.	.	.	.	2	.	10	20
FT Sill, OK	.	.	.	1	76	106	27	23	2	2	.	.	.	1	58	34
SOUTHEAST																
FT Gordon, GA	.	1	.	.	346	505	79	107	.	4	3	.	.	.	4	6
FT Benning, GA	.	.	1	2	288	269	82	76	.	1	.	.	.	1	76	45
FT Campbell, KY	.	.	.	.	503	585	67	88	.	.	.	.	.	.	33	15
FT Jackson, SC	.	.	.	.	224	183	40	47	.	3	.	.	.	.	.	87
FT Rucker, AL	.	1	.	.	62	61	8	4	1	1	.	.	.	.	10	5
FT Stewart, GA	3	1	4	.	646	734	171	139	2	4	18	.	1	.	96	63
WESTERN																
FT Lewis, WA	.	.	10	3	471	730	73	96	1	.	28	11	.	.	.	.
FT Irwin, CA	.	1	.	1	75	76	11	5	3	.	.	.	.	.	10	18
FT Wainwright, AK	.	.	17	.	119	178	14	13	.	.	.	.	28	18	.	.
OTHER LOCATIONS																
Hawaii	.	1	6	.	675	656	80	71	.	.	.	.	.	.	35	3
Germany	41	30	15	14	652	521	186	177	5	2	1	3	1	.	5	45
Korea	.	.	17	13	537	523	82	66	3	1	.	1	3	25	12	9
Total	**73**	**90**	**97**	**71**	**10,246**	**10,647**	**1,981**	**1,889**	**40**	**46**	**271**	**221**	**45**	**57**	**634**	**607**

‡Primary and secondary.

§Urethritis, non-gonococcal (NGU).

Sentinel reportable events for service members and beneficiaries at U.S. Navy medical facilities, cumulative numbers* for calendar years 2006 and 2007

Navy

Reporting locations	Number of reports all events†		Food-borne								Vaccine preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
NATIONAL CAPITOL AREA																
Annapolis, MD	33	0	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Bethesda, MD	88	35	5	1	7	.	3	2	2	.	.	.	.	1	.	.
Patuxent River, MD	1	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVY MEDICINE EAST																
Albany, GA	7	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Atlanta, GA	13	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Beaufort, SC	96	280	.	.	.	.	2	.	.	1	.	.	.	.	.	.
Camp Lejeune, NC	567	323	1	.	.	.	24	7	1	.	.	.	.	.	1	.
Cherry Point, NC	125	130	.	.	1	.	4	2	1	.	.	.	.	.	.	3
Great Lakes, IL	0	170	.	.	.	1	.	3	.	.	.	.	.	.	.	.
Jacksonville, FL	195	221	.	1	.	.	10	17	1	4	.	.	1	.	.	.
Mayport, FL	33	24	.	1	.	.	4	4	.	.	.	.	.	.	.	.
NABLC Norfolk, VA	55	64	.	.	1	.	1	.	.	.	.	.	.	.	.	.
NBMC Norfolk, VA	200	361	.	.	.	.	.	.	.	.	.	.	1	.	.	.
NEHC Norfolk, VA	2	5	.	.	.	.	.	.	.	.	.	.	.	.	.	2
North Charleston, SC	3	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pensacola, FL	82	89	.	.	.	3	3	7	.	3	.	.	.	.	.	5
Portsmouth, VA	1	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Washington, DC	1	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Guantanamo Bay, Cuba	0	4	.	.	.	.	.	1	.	.	.	.	.	.	.	.
Europe	31	22	9	.	1	.	1	.	1	.	.	.	.	.	.	.
NAVY MEDICINE WEST																
Camp Pendleton, CA	44	12	.	.	.	.	3	1	.	.	.	.	2	.	.	.
Corpus Christi, TX	1	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fallon, NV	3	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ingleside, TX	5	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lemoore, CA	66	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Pearl Harbor, HI	10	0	3	.	.	.	.	.	.	.	.	.	.	.	.	.
San Diego, CA	99	334	.	3	2	2	8	3	1	2	.	.	8	28	.	.
Guam	82	31	4	.	.	.	6	1	.	.	.	.	.	.	.	.
Japan	109	82	.	.	.	.	3	.	.	.	.	.	.	.	.	1
NAVAL SHIPS																
COMNAVAIRLANT/CINCLANTFLEET	93	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	44	36	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Total	**2,089**	**2,253**	**22**	**6**	**13**	**6**	**72**	**48**	**7**	**10**	**0**	**0**	**12**	**29**	**1**	**12**

*Events reported by January 7, 2007 and 2008

†Seventy medical events/conditions specified by Tri-Service Reportable Events Guidelines and Case Definitions, May 2004.

Note: Completeness and timeliness of reporting vary by facility.

Sentinel reportable events for service members and beneficiaries at U.S. Navy medical facilities, cumulative numbers* for calendar years 2006 and 2007

Navy

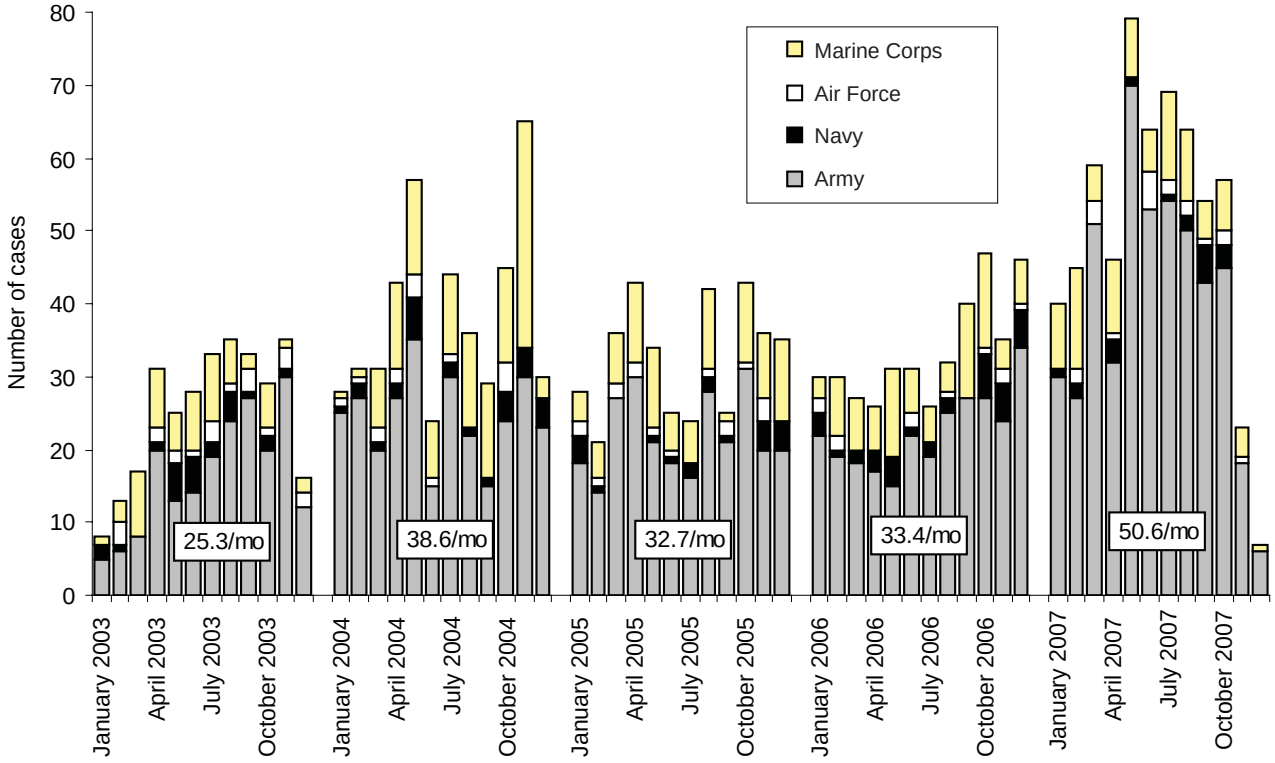
Reporting location	Arthropod-borne				Sexually transmitted								Environmental			
	Lyme disease		Malaria		Chlamydia		Gonorrhea		Syphilis‡		Urethritis§		Cold		Heat	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
NATIONAL CAPITOL AREA																
Annapolis, MD	.	.	.	.	27	.	4	.	.	.	.	.	.	.	.	.
Bethesda, MD	3	4	.	.	44	20	4	2	.	1	.	.	.	.	.	.
Patuxent River, MD	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
NAVY MEDICINE EAST																
Albany, GA	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	.
Atlanta, GA	.	.	.	.	8	1	5	1	.	1	.	.	.	.	.	.
Beaufort, SC	.	.	.	1	37	192	.	20	.	2	.	.	.	.	56	57
Camp Lejeune, NC	2	12	1	1	416	252	85	31	.	.	.	.	.	.	29	17
Cherry Point, NC	1	.	.	.	104	107	7	8	.	1	.	.	.	.	6	3
Great Lakes, IL	.	.	.	.	.	143	.	16	.	.	.	.	.	.	.	.
Jacksonville, FL	.	.	.	.	124	145	13	25	3	3	.	.	.	.	6	8
Mayport, FL	.	.	.	.	27	16	2	.	.	1	.	.	.	.	.	.
NABLC Norfolk, VA	.	.	.	.	43	56	9	8	.	.	.	.	.	.	1	.
NBMC Norfolk, VA	.	1	.	.	160	297	33	61	1	.	.	.	.	.	.	.
NEHC Norfolk, VA	.	.	.	1	.	2	.	.	.	.	.	.	1	.	1	.
North Charleston, SC	.	.	.	.	3	3	.	.	.	.	.	.	.	.	.	.
Pensacola, FL	.	.	.	.	74	50	1	6	.	.	.	.	.	.	2	12
Portsmouth, VA	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Washington, DC	.	.	.	.	1	5	.	.	.	1	.	.	.	.	.	.
Guantanamo Bay, Cuba	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.
Europe	.	.	1	.	15	21	1	1	.	.	.	.	.	.	.	.
NAVY MEDICINE WEST																
Camp Pendleton, CA	.	.	.	.	38	9	1	1	.	1	.	.	.	.	.	.
Corpus Christi, TX	.	.	.	.	1	3	.	1	.	.	.	.	.	.	.	.
Fallon, NV	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.
Ingleside, TX	.	.	.	.	4	3	.	.	1	.	.	.	.	.	.	.
Lemoore, CA	.	.	.	.	24	.	4	.	.	.	.	.	.	.	.	.
Pearl Harbor, HI	.	.	.	.	4	.	1	.	.	.	.	.	.	.	.	.
San Diego, CA	.	1	1	.	57	217	9	36	2	5	.	.	.	.	.	.
Guam	.	.	1	.	59	25	9	4	.	.	.	.	.	.	1	.
Japan	.	.	.	.	96	57	9	10	.	.	.	.	.	.	1	9
NAVAL SHIPS																
COMNAVAIRLANT/CINCLANTFLEET	2	.	.	.	71	9	18	2	2	.	.	.	.	.	.	.
COMNAVSURFPAC/CINCPACFLEET	.	.	.	.	6	24	35	10	.	.	3	.	.	.	.	1
Total	**8**	**18**	**4**	**3**	**1,455**	**1,660**	**250**	**243**	**9**	**16**	**3**	**0**	**1**	**0**	**103**	**107**

‡Primary and secondary.

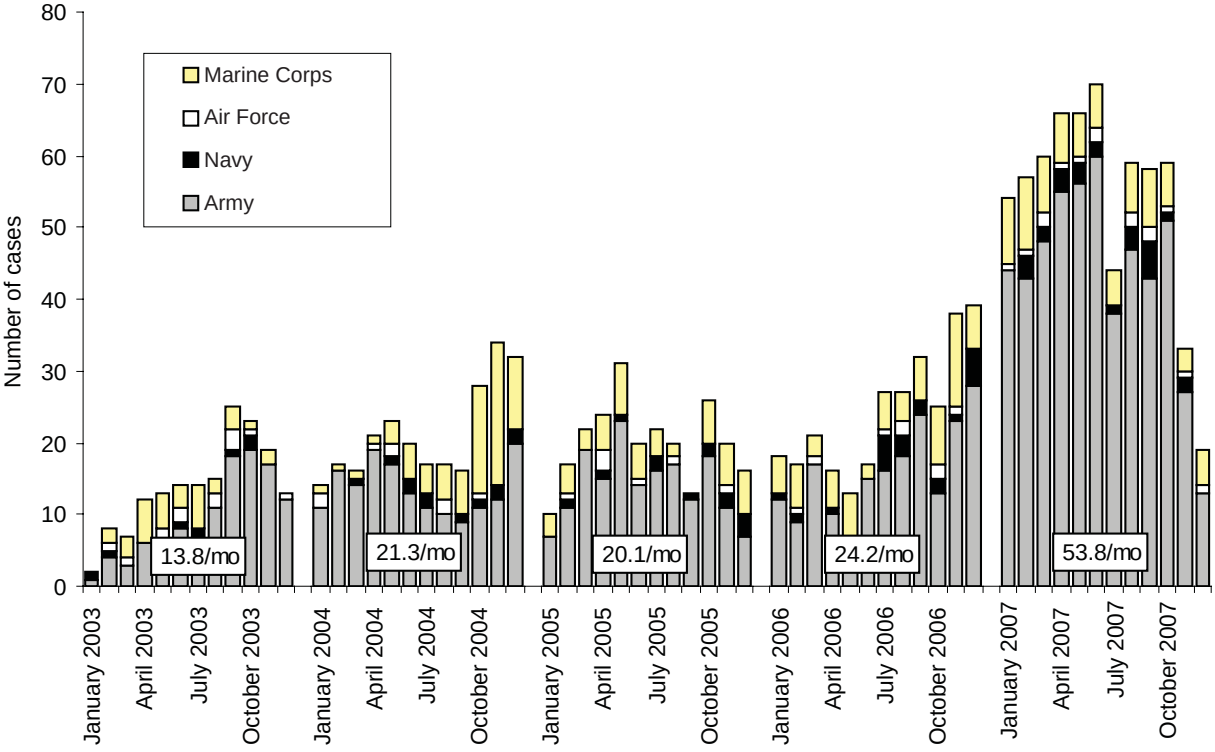
§Urethritis, non-gonococcal (NGU).

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003-December 2007

Traumatic brain injury, hospitalizations (ICD-9: 800-804, 850-854, 959.01)*



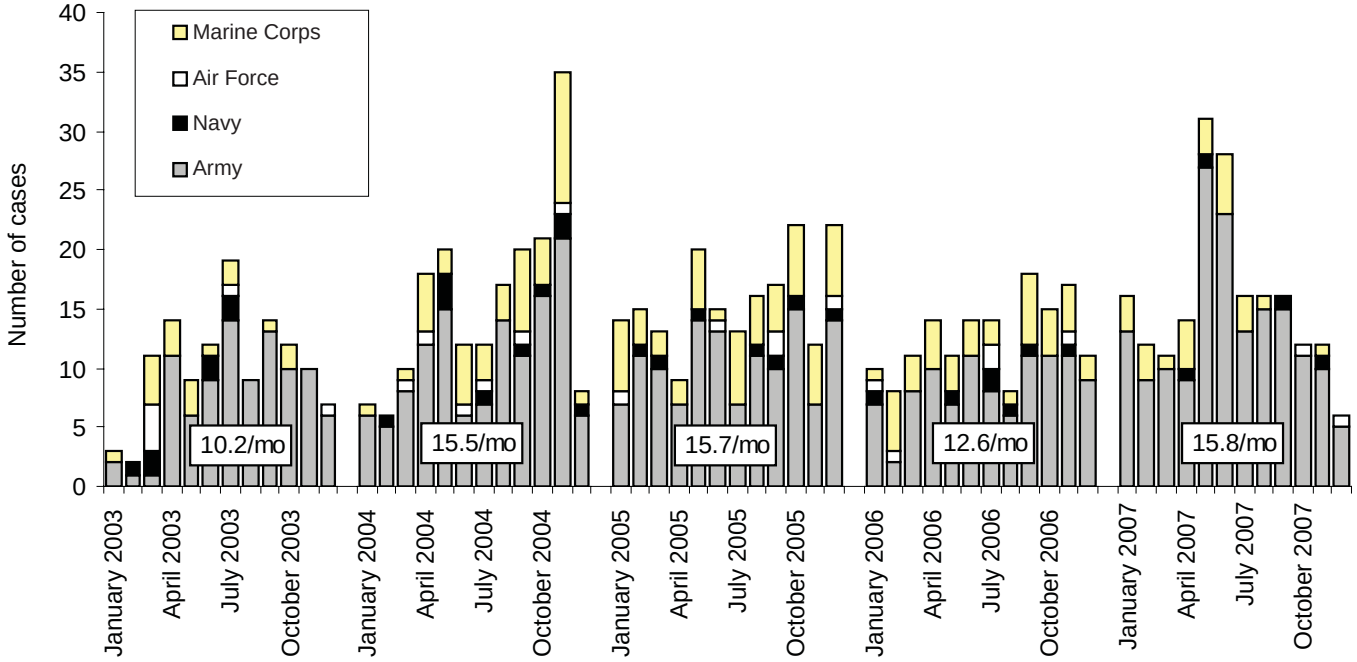
Traumatic brain injury, multiple ambulatory visits (without hospitalization), (ICD-9: 800-804, 850-854, 959.01)†



Reference: Army Medical Surveillance Activity. Traumatic brain injury among members of active components, U.S. Armed Forces, 2002-2007. *MSMR*. Aug 2007; 14(5):2-6.
*Indicator diagnosis (one per individual) during a hospitalization while deployed to/within 365 days of returning from OEF/OIF.
†Two or more ambulatory visits at least 7 days apart while deployed to/within 365 days of returning from OEF/OIF.

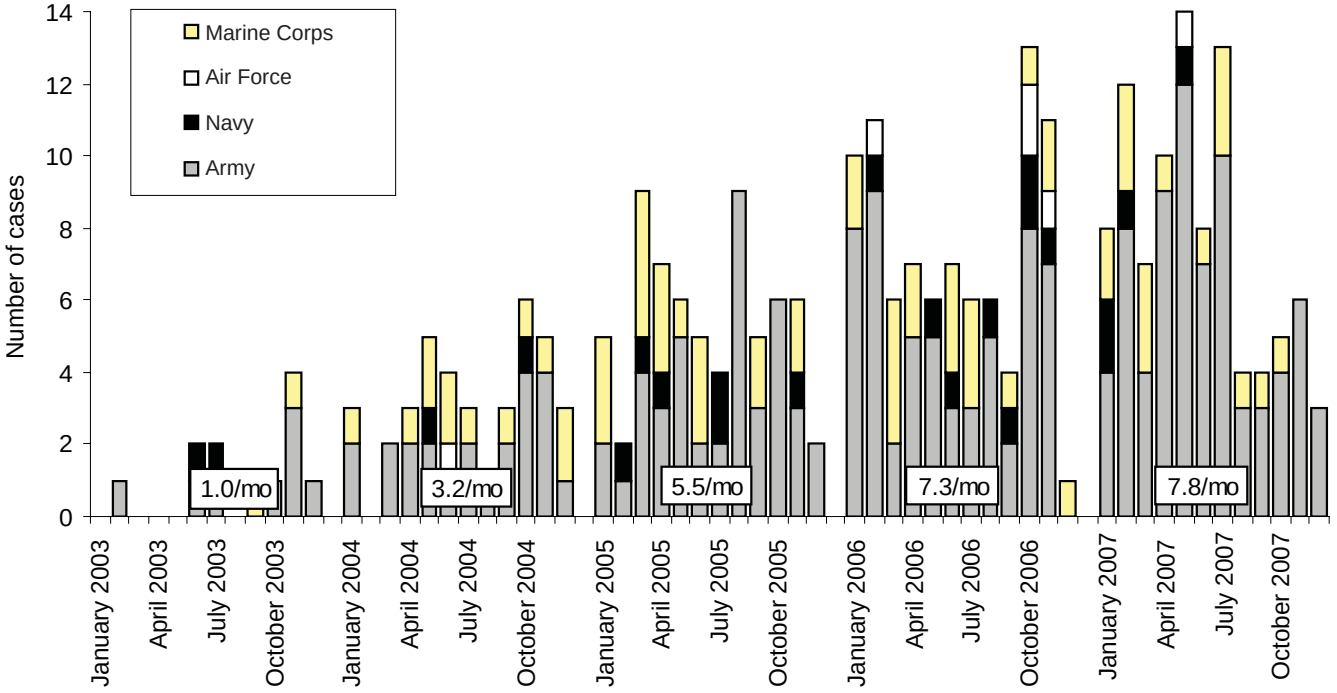
Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003-December 2007

Amputations (ICD-9: 887, 896, 897, V49.6 to V49.7, PR 84.0 to PR 84.1)*



Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: amputations. Amputations of lower and upper extremities, U.S. Armed Forces, 1990-2004. *MSMR*. Jan 2005;11(1):2-6.
*Indicator diagnosis (one per individual) during a hospitalization or ambulatory visit while deployed to/within 365 days of returning from OEF/OIF.

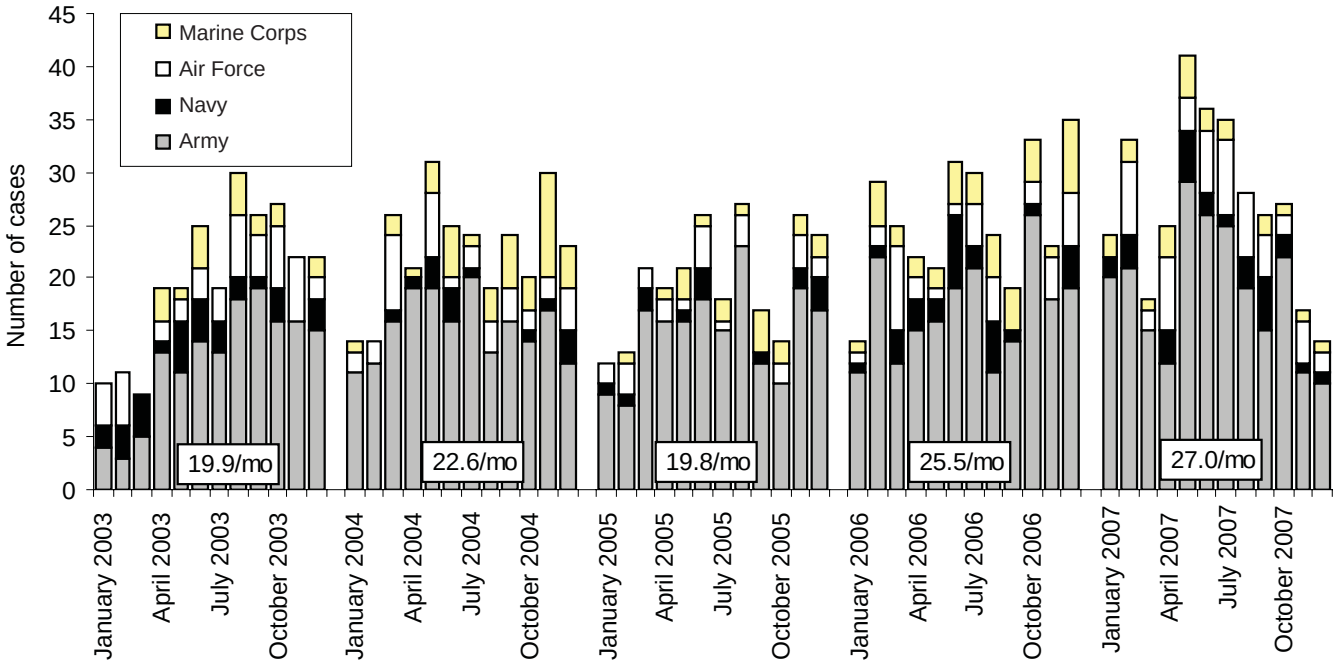
Heterotopic ossification (ICD-9: 728.12, 728.13, 728.19)†



Reference: Army Medical Surveillance Activity. Heterotopic ossification, active components, U.S. Armed Forces, 2002-2007. *MSMR*. Aug 2007; 14(5):7-9.
†One diagnosis during a hospitalization or two or more ambulatory visits at least 7 days apart while deployed to/within 365 days of returning from OEF/OIF.

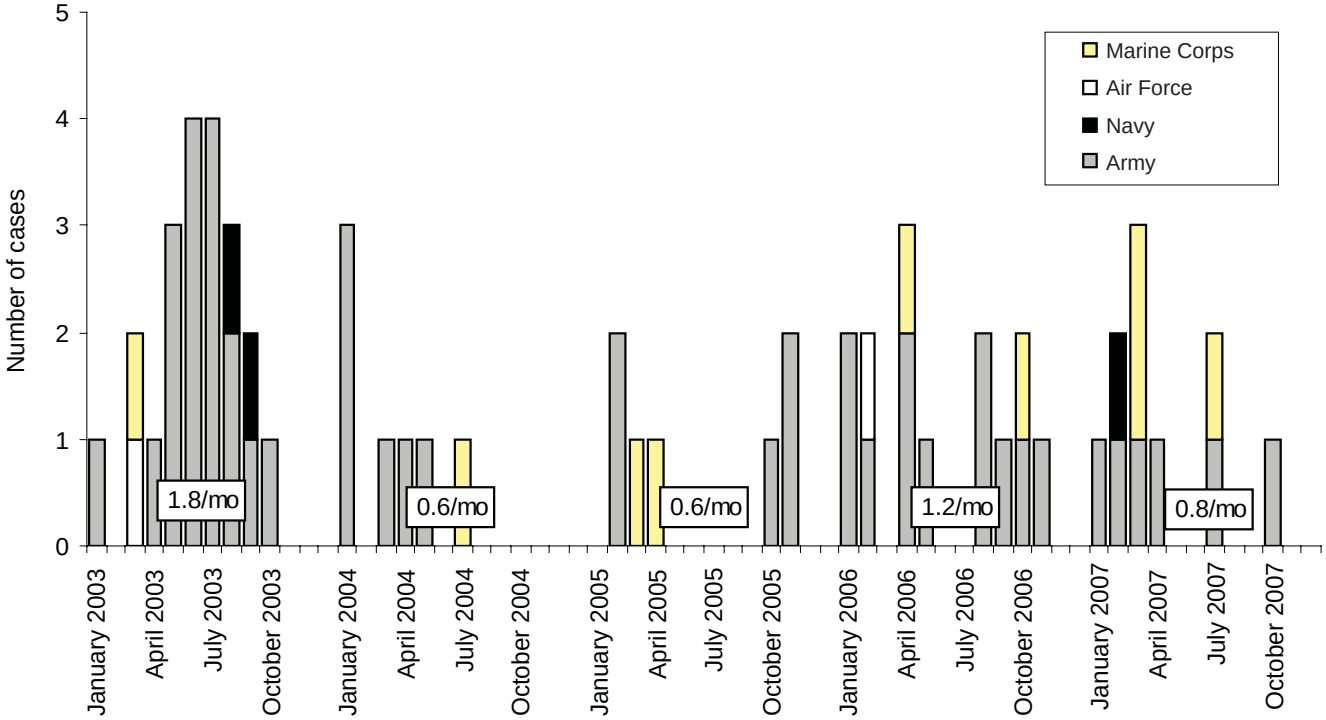
Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003-December 2007

Deep vein thrombophlebitis/pulmonary embolus (ICD-9: 415.1, 451.1, 451.81, 451.83, 451.89, 453.2, 453.40 to 453.42 and 453.8)*



Reference: Isenbarger DW, Atwood JE, Scott PT, et al. Venous thromboembolism among United States soldiers deployed to Southwest Asia. *Thromb Res*.2006;117(4):379-83.
*Indicator diagnosis (one per individual) during a hospitalization while deployed to/within 90 days of returning from OEF/OIF.

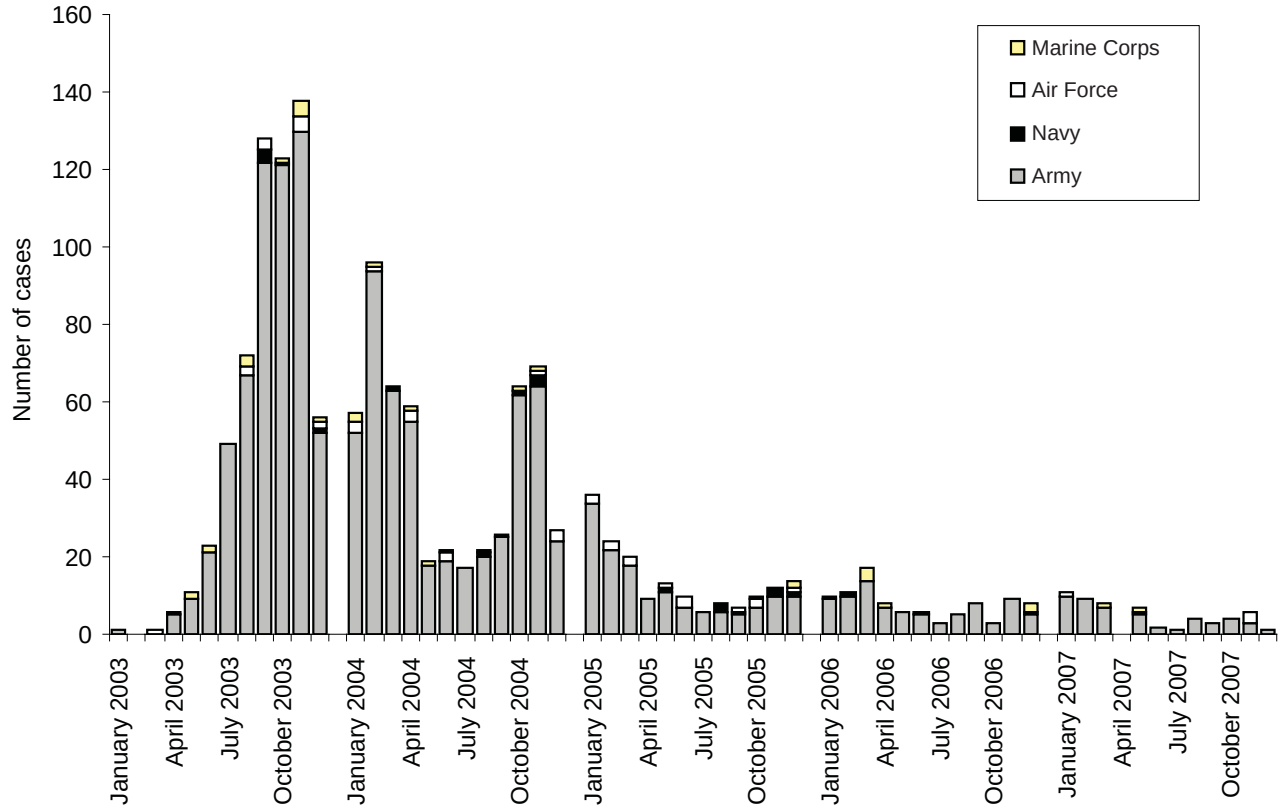
Severe acute pneumonia (ICD-9: 518.81, 518.82, 518.3, 480-487, 786.09)†



Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: severe acute pneumonia. Hospitalizations for acute respiratory failure (ARF)/acute respiratory distress syndrome (ARDS) among participants in Operation Enduring Freedom/Operation Iraqi Freedom, active components, U.S. Armed Forces, January 2003-November 2004. *MSMR*. Nov/Dec 2004;10(6):6-7.
†Indicator diagnosis (one per individual) during a hospitalization or ambulatory visit while deployed to/within 30 days of returning from OEF/OIF.

Deployment-related conditions of special surveillance interest, U.S. Armed Forces, by month and service, January 2003-December 2007

Leishmaniasis (ICD-9: 085.0 to 085.9)*

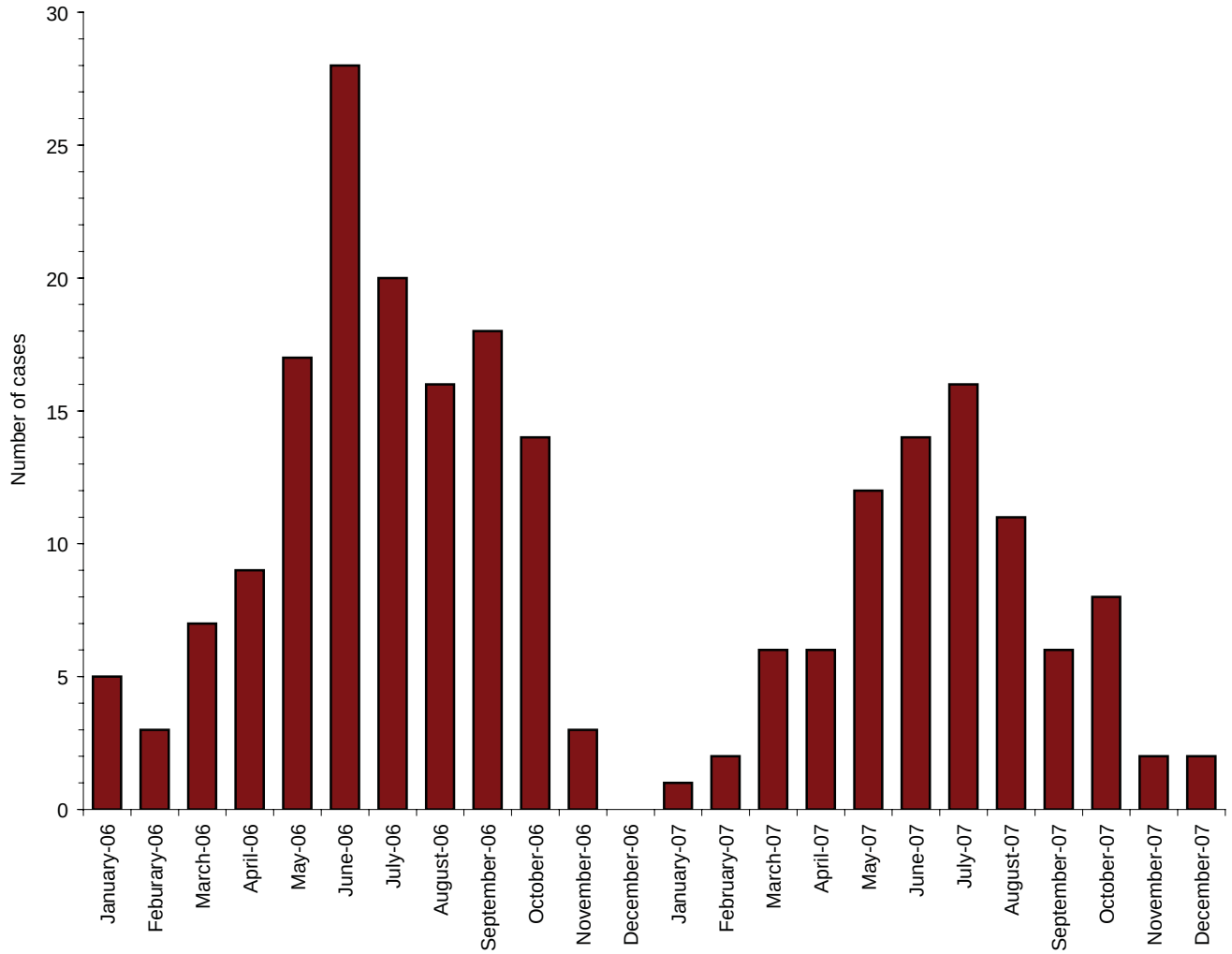


Reference: Army Medical Surveillance Activity. Deployment-related condition of special surveillance interest: leishmaniasis. Leishmaniasis among U.S. Armed Forces, January 2003-November 2004. *MSMR*. Nov/Dec 2004;10(6):2-4.

*Indicator diagnosis (one per individual) during a hospitalization, ambulatory visit, and/or from a notifiable medical event during/after service in OEF/OIF.

IN THE NEXT *MSMR*:

Diagnoses and reports of malaria, by month of clinical presentation/diagnosis, U.S. Armed Forces, 2006-2007



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